DOCUMENT RESUME

ED 148 492 95 PS 009 728

AUTHOR	Ferb, Thomas E.; And Others
TITLE	Education as Experimentation: A Planned Variation Model. Volume IV-D. Part I: A Longitudinal Study of Follow Through. Part II: A Study of Academic Risk.
INSTITUTION	Abt Associates, Inc. Cambridge, Mass.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Office of Planning, Budgeting, and Evaluation.
REPORT NO	AAI-76-196D
PUB DATE	15 Apr 77
CONTRACT	300-75-0134
NOTE	261p.; For Volumes 1A and 1B of this report, see ED 094 890 and ED 094 891; for Volumes 2A and 2B, see ED 108 768 and ED 108 769; for Volumes 3 and 4, see PS 009 725-727 and PS 009 729; For related document, see PS 009 724 ; Not available in hard copy due to poor reproducibility
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	*Academic Achievement; Compensatory Education; *Disadvantaged Youth; Early Experience; Educationally Disadvantaged; Family Income; Locus of Control; Longitudinal Studies; Parental Background; *Primary Education; *Program Effectiveness; *Program Evaluation; Statistical Data; Tables (Data); Verbal Ability
IDENTIFIERS	*Planned Variation; *Project Follow Through

ABSTRACT

This segment of the national evaluation study of the Follow Through Planned Variation Model presents an analysis of the longitudinal effects of Follow Through program models and a study of Follow Through children who were identified as being at academic risk. The longitudinal analysis examines three dimensions of program effects: (1) differences in program effects at the beginning, middle, and end of the program, (2) the relationship between the child's preschool experience and progress in Follow Through, and (3) differences in program effects in different achievement areas. The study of academic risk children focuses on three other aspects of program effects: (1) patterns of achievement across grades for Follow Through versus non-Follow Through children at high and low academic risk, (2) differences in individual sponsors' outcomes for high versus low academic risk children, and (3) differences in patterns of achievement outcomes for the four indicators of academic risk (family income, educational level of head of household, child's Peabody Picture Vocabulary Test scores at the beginning of kindergarten, and parents' scores on a locus of control scale). Approximately 50 pages of appendices are included. (JMB)

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ED148492

Education as Experimentation: A Planned Variation Model

Volume IV-D

Part I: A Longitudinal Study of Follow Through

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Part II: An Academic Risk Study

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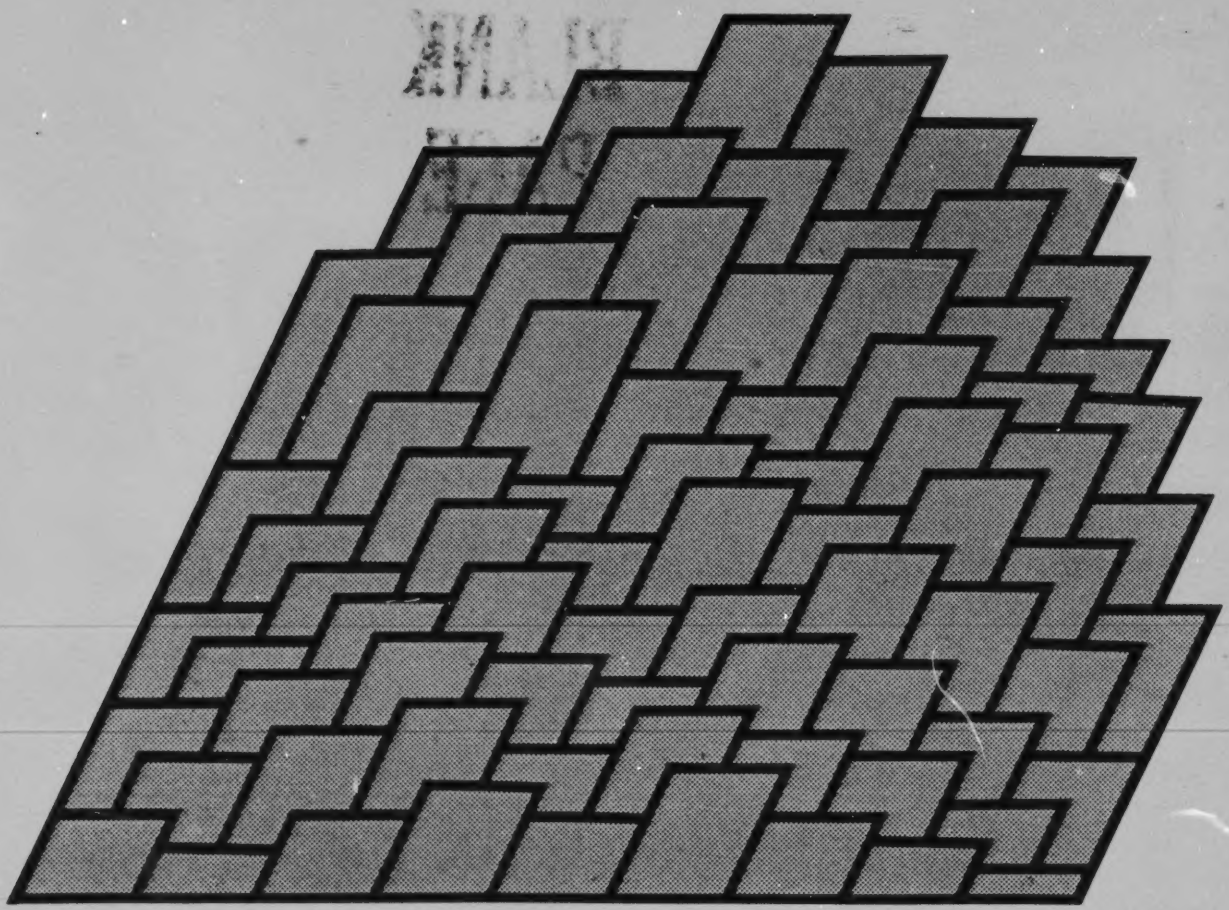

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Report No. 76-196D

Contract No. 300-75-0134

EDUCATION AS EXPERIMENTATION: A PLANNED VARIATION MODEL

VOLUME IV-D

PART I

A LONGITUDINAL STUDY OF FOLLOW THROUGH

PART II

A STUDY OF ACADEMIC RISK

15 April 1977

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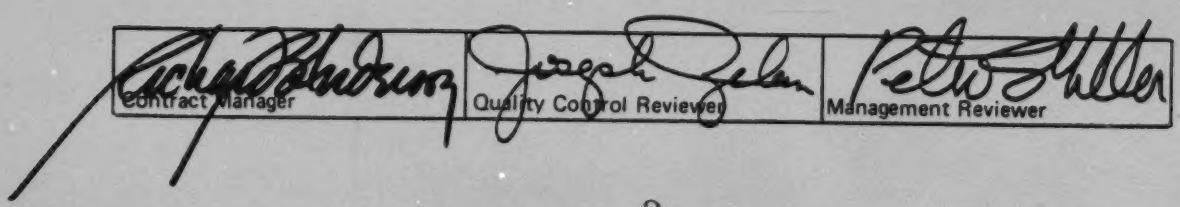
Prepared for:

THE U.S. OFFICE OF EDUCATION

Office of Planning, Budgeting, and Evaluation
Department of Health, Education, and Welfare
Washington, D.C. 20202



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ACKNOWLEDGEMENTS

This volume represents the collective efforts of the authors and a long list of other individuals. As Study Director Thomas Ferb was primarily responsible for coordinating the effort, and for providing continuity. He was ably assisted in the preparation of Part I, A Longitudinal Study of Follow Through by John Larson, who was primarily responsible for the substantive emphasis of the study, and by David Napior, who contributed the novel analysis approach. Ennio Mingolla provided substantial support in the form of data file development and in the writing of this report, as did Patricia Evans.

Bernadette Nelson is responsible for Part II of the Volume, A Study of Children at Academic Risk. She was assisted in the writing and analysis by Ennio Mingolla and Thomas Ferb.

In addition to these individuals, the authors of this study, the contribution of the project management team, Richard Anderson, Project Director, Linda Stebbins, Deputy Project Director and Elizabeth Proper, Director of Analysis, must be acknowledged. As Project Director, Richard Anderson, ensured that the study had sufficient resources and autonomy to be completed. Numerous other staff members of Abt Associates also contributed to this report either directly or indirectly. The careful review of early drafts by Eugene Royster, Geoffrey Bock and Joseph Zelan contributed to the refinement of the report. The nameless typists who produced the report must be thanked. Finally, the data processing staff headed by Sanford Friedman must be thanked for the excellent user-oriented software utilized in the study.

Numerous individuals outside of Abt Associates also contributed to the study. The Office of Education staff, in particular Mary Kennedy and Eugene Tucker, made the study possible and provided useful guidance and review. Finally, the project consultants, in particular Richard

Light and the staff of the Huron Institute, Walt Haney, Herbert Weisberg and Anthony Bryke, provided direction for the analysis and substantially shaped the study.

PART I

LONGITUDINAL STUDY

CHAPTER ONE

INTRODUCTION

Previous studies in the National Evaluation of Follow Through have examined the effects of the program over various intervals, e.g., kindergarten entry to the end of third grade, but have not considered the longitudinal and possibly cumulative effects of program participation over the four year period from kindergarten through third grade.* The study described in this volume presents an analysis of the longitudinal effects of the programs by examining achievement scores at the beginning, middle and end of the program in order to determine whether program effects differed significantly over the course of four years. We also investigate two other topics of central importance to the original concept of Follow Through: the relationship between the child's preschool experience and progress in Follow Through; and differences in effects in different achievement areas. In brief, the objectives of this study are:

- To determine when, during a child's experience in a particular FT program, he/she is likely to benefit; that is, when programs have effects;
- To determine whether different programs have effects in different achievement areas; and
- To determine whether program effects vary depending on a child's preschool experience.

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* One prior longitudinal study was conducted; see M.G. Cline, et al., Education as Experimentation: Evaluation of the Follow Through Planned Variation Model, Volume IIB, monographs and appendices, 1975, in particular, monograph I: An interim analysis of longitudinal FT/NFT site level differences in academic achievement. This study was, however, restricted to effect during kindergarten and first grade.

Timing of Effects

Critical differences among the Follow Through models are found in their goals and objectives and in their conceptualization of how children learn. These aspects of the sponsors' models translate into different expectations concerning the performance of children on achievement measures* during the course of their participation in a program. A primary dimension on which the programs vary and one which has implications for the timing of effects is the program's emphasis on affective and motivational areas relative to academic achievement. All sponsors subscribe to the goal of developing healthy, happy children with high self-esteem. However, they differ in their interpretations of the etiology of these goals. Some sponsors argue that a child's self-esteem is built upon the child's own experience of successes in specific learning events, e.g., academic achievement. Others argue that academic achievement, as well as sustained school success, has as a prerequisite positive attitudes toward school, learning and the self. While there inevitably must be some relationship between the academic and affective areas, teachers nevertheless spend classroom time in significantly different ways emphasizing experiences which reflect the model's philosophy of child development. Over a period of years, then, we would expect to observe different patterns of progress on measures of academic achievement for programs which emphasize achievement versus affective areas.

Aside from the differences in the substantive emphasis of programs, there is an additional important factor which should affect the children's progress on academic achievement skills. The children in the different programs vary in their experience with achievement tests in general and with the question and answer format in which the test items are presented. Some programs do not give any standardized tests to their children as a matter of principle. Other programs structure much of a child's classroom experience in a question and answer format and frequently assess children's progress using standard instruments. This difference between programs on practice

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* The importance of examining various content areas in the longitudinal evaluation of Follow Through including academic achievement was recognized by the evaluation planners at the Office of Education and at Stanford Research Institute. In response to this need they included tests in the third grade battery to measure problem-solving ability, self-esteem, and locus of control. Unfortunately, these measures were not systematically included in the test battery at earlier ages, and only academic achievement measures are available longitudinally.

and experience with achievement tests should substantially affect the pattern of progress as measured by such tests.

Although it is not possible to state explicit hypotheses concerning the amount of progress that the children in a given program should achieve during a given period, more general statements concerning the likely pattern of progress for particular programs can be formulated. Programs which emphasize academic activities should produce a more or less even rate of academic progress across grades. Programs with an affective emphasis, which stress self concept and attitudes toward school, will often do so at the expense of explicit academic activities. Given limited classroom resources, these programs promise academic progress, but only after the child has achieved sufficient personal growth and confidence to deal with academic skills. Children in such a program would be expected to show less academic progress early in the program relative to children in another type of program and then to catch up to their peers at a later point.

A third type of program emphasizes problem solving and thinking. Advocates of such cognitively oriented programs argue that academic achievement should not be an end in itself but is rather one among many available means for developing a child's ability to reason. These advocates argue that traditional academic skills are among the least desirable devices for developing a child's ability to reason. Therefore, little if any classroom time is spent developing and practicing such skills. However, given a minimum level of competence in reasoning and some experience, a child in one of these programs should be able to "figure out" an achievement test or other traditional academic task. Thus, the expected pattern of performance for children in such a program is similar to children in a program with an affective emphasis: little if any academic progress early in the program, followed by more substantial progress when the child can generalize his/her reasoning skills.

Finally, there is a fourth type of program that is nonspecific with respect to curriculum emphasis. One such program attempts to involve parents as equal partners in the education process and thereby increase the intensity and the quality of the child's school and educational experience. Another of these nonspecific programs leaves the specification of the curriculum content up to the local school and attempts to aid the school in dealing with children in an individualized manner. Given the nonspecific

nature of these programs and the opportunity for local variation of emphasis, no particular pattern of progress would be expected to characterize this set of programs.

Achievement Areas

Although only achievement measures are available longitudinally, the consideration of sub-areas of achievement and the identification of program effects by sub-areas can prove illuminating. Various achievement areas may prove to be differentially amenable to instruction. The academic tests utilized in this evaluation provide an opportunity to analyze discrete areas of performance. The reading and math areas can be treated as separate outcomes. Furthermore, the math measures include tests both of specific computational skills and of more complex verbal and conceptual reasoning. Previous studies in Follow Through have indicated differential sponsor effects across these computational and conceptual areas. Thus, this study will examine reading, math computations, and math concepts as separate outcome areas.

Preschool Experience

Inherent in the original concept of Follow Through was the goal of sustaining benefits arising from Head Start experiences. A decade ago, policy planners for the War on Poverty sought to enhance the school adjustment of children from poor backgrounds with a stimulating summer of preschool experiences; however, they soon extended Head Start to a year-long program, realizing that six weeks of stimulation cannot compensate for six years in an "impoverished environment."

Results from many of the evaluations of early education programs during the 1960s were mixed. While many programs were able to demonstrate positive effects during the preschool years, the relative benefits of preschool attendance appeared to erode during the first few years of elementary school, or were at least counterbalanced by the rapid progress of children who had not attended such programs. In the hope of sustaining the benefits of Head Start, Follow Through was conceived as an extension of the preschool education experience into the elementary school as far as third grade. A central objective of the longitudinal study is thus to determine whether or not the Follow Through models are able to sustain the benefits of preschool experience and of Head Start in particular.

The separate study of graduates of Head Start and graduates of other preschool experience is also essential both because Head Start is a federally funded intervention program and because Head Start may provide substantially different experiences from those in other preschool programs. Head Start, as a national program, has a distinctive profile of services to parents and children including the goal of enhancing children's social competence. Head Start centers around the country no doubt attempt to achieve the stated objectives with varying degrees of success. Other preschool experience, at least as defined in this study, includes programs ranging from Montessori preschools to custodian day care centers. Thus, the separation of Head Start from other preschool arises from the non-specific character of other preschool experiences.

In summary the principle aims of the longitudinal study are the exploration of sponsor impacts across different grades for children who have had different preschool experiences. The outcome measures are restricted to scores from academic achievement tests, including reading, and math measures. The following chapters discuss the sample, the analysis strategy used for the longitudinal study, the results and our conclusions about them.

CHAPTER TWO

CHARACTERISTICS OF THE CHILDREN AND SOME RESEARCH DESIGN ISSUES

The Follow Through evaluation design includes several cohorts, each containing a group of children who entered school in kindergarten and a group who entered in first grade. The present study focuses on the Follow Through (FT) and comparison (NFT) children in the kindergarten group from the third cohort (Cohort III-K).* These children began school in the fall of 1971 and received comprehensive achievement testing in the fall of 1971 and in each spring until the end of the third grade in 1975, when their participation in the evaluation ended.

The FT and NFT children in the Cohort III-K group and the sites in which they are found were not selected with an eye toward representativeness. In fact, the sites were not selected, but instead volunteered to participate in the program. The children themselves may have entered a Follow Through classroom because the school considered the child to be eligible for a program on the basis of economic or educational need, because a parent desired to have a child participate in a program, or because of any of a variety of undocumented and perhaps arbitrary reasons. Furthermore, enrollment in a comparison classroom likewise was determined by unspecified factors. The end results of this selection process are that:

- The sample and subsamples are fortuitous or haphazard.

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* The first grade group was not analyzed because the group is substantially smaller in size than the kindergarten group, and because the available sites are restricted to the Southeast. The cohorts other than the third did not receive achievement testing between entry to school and the spring of third grade in a systematic manner.

- The program and comparison children are often not comparable on a variety of important dimensions related to school achievement.

The impact of these design issues is considered further in this discussion and in the development of the analysis strategy (Chapter Three).*

The choice of children included in this study was constrained also by the availability of test data. Not all children were tested at every time point. Of the approximately 8,000 children who were tested in the fall of kindergarten and in the spring of third grade, successively smaller subsets have data at additional points in time. Since the focus of this study is longitudinal, a compromise between the need for a sufficient sample size versus test data across time had to be achieved. The final sample includes only children with achievement test data at entry to kindergarten, at the end of first grade, and at the end of third grade. This pattern of available test data permits longitudinal analysis and preserves the sample size for most groups. The requirement of the availability of children with test data and other constraints on case selection** substantially reduced the number of children available for analysis to approximately 2,500.

Clearly, the simultaneous exploration of the impact of Follow Through programs on children with different preschool experience in different sites would have been desirable. Such a study would clarify the stability of program impact across sites by preschool categories, would shed light on the differential impact of the programs for children with different preschool experience, and could add substantially to our understanding of implementation. Since programs are implemented within sites

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* It should be noted that the list of design problems and issues that have arisen during the course of the Follow Through evaluation is quite long and ranges from inappropriate measurement to the absence of implementation data (see Chapter Four of Volume IV-A). Few of these issues are resolved in this study; however, several are addressed from a new perspective.

** In addition to the exclusion of children with missing achievement data, children were excluded because of: (1) unknown preschool experience; (2) Chinese, American Indian, Portuguese or other ethnic membership which occurred with low frequency; and (3) changes in program participation, e.g., transfer from one sponsor's program to another.

and since a program's impact on children is influenced by the success or failure of implementation, the site is a critical level of analysis. Furthermore, past Follow Through evaluations have demonstrated substantial variability in program effects among sites.*

However, the numbers of children within the site-by-preschool categories, shown in Table I2-1 for Non-Follow Through children and in Table I2-2 for Follow Through children, are too small for the simultaneous exploration of both the preschool and site issues. Since other studies in the Follow Through evaluation (notably Volume IV-B of this report) focus on site and since the effects of different preschool experience have not yet been adequately explored during the course of the prior evaluations, the latter issue is given precedence in this study and the site issue is ignored.**

Groups of Interest

The following sections describe the Non-Follow Through (NFT) and program groups. First, the background characteristics and entry achievement scores of the NFT preschool subgroups are presented and compared. The presentation includes Non-Follow Through Head Start graduates (HS), children with no preschool (NPS), and children with experience in some other preschool (SPS), perhaps in addition to Head Start. The separation of the descriptions for these three preschool groups is in line with the emphasis of this study on the potential interaction of preschool experience with Follow Through experience. Second, a comparison

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* The utilization of site in the Follow Through evaluation has been motivated primarily by the issue of implementation and little attention has been given to the loss of statistical power associated with the estimation of differences between FT and NFT at the site level. Given that the small effects (e.g., one percent of outcome variance or one-quarter of an outcome standard deviation) found in the evaluation thus far are representative of the "real" program impacts, the likelihood of finding such a difference in a single site consisting of approximately 30 children is quite low (about 1 in 20) even when a reasonably powerful regression model is utilized (e.g., a model which accounts for 50 percent of the variance).

** It should be noted that ignoring the variability of programs across sites limits the generalizations that can be drawn from this study. It is entirely possible that a study of site effects ignoring preschool would indicate that the impacts of some programs vary across site.

of each model's groups (HS, NPS, and SPS) with the respective Non-Follow Through group is presented. The former presentation is oriented primarily toward characterizing the comparison group, while the latter presentation attempts to explicate the appropriateness/inappropriateness of the comparison of each Follow Through group (HS, NPS, SPS) to its respective Non-Follow Through (NFT) comparison group.

Before turning to the discussion, the relatively small size of many of the groups must be emphasized. Table 2-1 presents the number of children in each preschool comparison group for each sponsor with a sufficient number of children to be included in the longitudinal study. The table cells that contain fewer than 30 children are shaded. This practice will be utilized throughout the study to remind the reader that the values presented reflect a small number of children often drawn from diverse sites, schools and classrooms.

Table 2-1
NUMBER OF CHILDREN BY PRESCHOOL BACKGROUND AND FOLLOW THROUGH STATUS

FOLLOW THROUGH STATUS	Preschool Background		
	HS	NPS	SPS
All Non-FT (NFT)	175	646	286
Follow Through Sponsor			
Responsive Education	62	23	40
TEEM	91	65	14
Bank Street	25	34	45
DIM	110	18	51
Behavior Analysis	163	85	57
Cognitive Curriculum	59	15	20
Parent Education	44	52	43
EDC	37	26	65
IELP	33	36	21
SEDL	105	73	84
CAL Process	24	21	58

A Comparison of the NFT Preschool Groups

A description and comparison of the NFT preschool groups provides further motivation for studying the preschool groups separately and provides background essential for a meaningful interpretation of this study's findings. This study rests on the assumption that the progress across grades of these NFT children represents an adequate standard by which to judge or measure the impacts of the FT programs. It is not possible to evaluate objectively the representativeness of these groups with respect to national norms or other external criteria since the groups were not selected to be representative of any larger group (e.g., disadvantaged students). Furthermore, the groups are aggregates of diverse sites, schools, and classrooms. Thus, the issue of representativeness and therefore the generalization of the findings of this evaluation rest with the judgement of the authors and the readers.

The central questions of interest in the exploration of the characteristics of NFT children are: (1) Do the NFT children have background characteristics which suggest that they comprise an adequate comparison group with which to compare the progress of FT children?; and (2) Do the differences between the NFT children with different preschool experience motivate the separation of the children into the groups?

Overall, ignoring preschool groups, the NFT children do appear to be economically disadvantaged relative to the national population. The medial income of NFT families (see Table 2-2) is only $6390 in comparison with $9590* for the national population. Furthermore, a substantial percentage (65 percent) of the comparison children are members of minority groups versus only 13 percent* for the national population. Based on the available data, the majority of comparison children appear to be similar to "disadvantaged" children who would be eligible for Follow Through or some other compensatory education program. That most of these children come from families with low income and are members of minority groups suggests that the comparison children may in fact provide an adequate standard with which to measure program impacts.

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* 1970 Census of Population, Characteristics of the Population, Vol. 1, U.S. Dept. of Commerce, Bureau of the Census, 1973.

Table 2-2

CHARACTERISTICS OF THE CHILDREN IN THE COMPARISON (NFT) GROUPS

Characteristic	All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN	1107	175	646	286
PERCENT OF CHILDREN	100.0	16.1	58.2	25.7
ENTRY AGE IN MONTHS				
Mean	64.6	65.2	64.4	64.7
Standard Deviation	4.2	4.7	4.2	4.0
Median	64.4	64.9	64.2	64.7
SEX Percent Female	51.7	49.4	52.1	52.3
FAMILY INCOME ($100)				
Mean	63.9	47.4	67.6	67.5
Standard Deviation	29.4	26.8	28.0	29.8
Median	62.9	43.5	71.6	72.6
Percent Missing	26.7	17.2	34.1	15.7
PERCENT FAMILIES WITH INCOME $\geq$ $9,999	22.0	9.4	22.4	28.9
FAMILY SIZE				
Mean	5.7	6.0	5.8	5.4
Standard Deviation	2.1	2.4	2.0	2.2
Median	5.3	5.4	5.4	4.9
Percent Missing	24.4	16.1	31.0	14.6
HIGHEST OCCUPATION IN HOUSE				
Mean	14.5	13.7	14.4	15.2
Standard Deviation	2.4	2.1	2.3	2.7
Median	13.8	13.1	13.7	15.5
Percent Missing	27.2	19.4	33.3	18.1
MOTHER'S EDUCATION				
Mean	5.5	5.5	5.4	5.9
Standard Deviation	1.2	1.2	1.2	1.2
Median	5.6	5.5	5.5	5.9
Percent Missing	28.1	22.2	33.9	18.5
CHILDREN'S ETHNICITY				
Percent Black	44.4	59.4	38.9	47.4
Percent White	45.1	31.1	48.5	46.0
Percent Spanish Surname	10.5	8.9	12.6	6.6
FIRST LANGUAGE				
Percent English	92.2	98.3	89.1	95.5
Percent Spanish	6.6	1.1	9.2	4.2
PERCENT BILINGUAL CHILDREN	10.6	6.7	13.4	7.0
KINDERGARTEN WRAT				
Mean	29.8	28.9	28.4	33.4
Standard Deviation	12.8	12.0	12.8	12.7
Median	28.0	27.6	26.3	32.0
KINDERGARTEN PSI				
Mean	17.0	16.8	16.5	18.4
Standard Deviation	5.6	5.6	5.6	5.2
Median	17.6	17.6	16.9	18.8

*For definition of terms see Appendix A Table A-1.

A comparison of the three preschool groups suggests that there are substantial differences among the groups that motivate their separate study. Over one-half of the Non-Follow Through children have had no preschool experience (NPS), about one-fourth have had some preschool experience (SPS) (possibly in addition to Head Start), and only 16 percent of the children graduated from a Head Start program (HS).* While the three groups are about the same age at entry to school and contain similar, balanced distributions of boys and girls, the ethnic composition of the three groups varies. The Head Start group contains the smallest proportion of White children, about one-third, compared to nearly one-half for the other groups. Most HS children are Black, and a small proportion of children have Spanish surnames; a still smaller proportion use Spanish as a first language. The SPS group contains equal proportions of Black and White children and few Spanish surnamed children. The NPS group contains the smallest percentage of Black children, the highest percentage of Spanish-surnamed children and the highest percentage of children -- among the three preschool groups -- who use Spanish as their first language.

The HS group ranks lower in socioeconomic status (SES) than the other two groups. HS families are similar in size to NPS families and larger than SPS families, but their median income is nearly $3000 lower than the NPS and SPS families. The income difference between the groups is highlighted by the proportions of families with incomes of $10,000 or more. Fewer than one in ten HS families have incomes this high, compared to about one in four for the rest of the NFT families. The median occupational status for HS households is clerical worker, for the NPS households, salesperson, and for SPS households, craftsman or foreman. Mothers in all three groups have, on the average, entered but not finished high school, although a greater proportion of SPS mothers graduated from high school than other mothers. It should be noted that roughly one-third of the NPS group has missing data on each of the SES indicators, while only about 15 to 20 percent of these data are missing for the other groups. Since it is reasonable to assume that the families whose data

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* See Appendix Table I2-3 for definitions of variables.

are missing would tend to be among the poorest, there may be a bias elevating the NPS group's reported socioeconomic status, and particularly on the percentage of families with income of $10,000 or more.

The HS and NPS children have similar achievement test scores at kindergarten entry, while the SPS children score noticeably higher on both the WRAT and the PSI. We have seen that on most SES indicators the HS children are more disadvantaged than the other two groups. The absence of an appreciable difference in entry test scores between HS and NPS children, despite the large income difference, suggests that the HS children may have benefited from their preschool experience.

In general, the similarities and differences in the characteristics of these groups are in line with conventional wisdom concerning disadvantaged children. The Head Start graduates are socioeconomically the least well off and have relatively low test scores at entry to kindergarten. Many families of children in the "some preschool" category appear to be middle class, that is, to have incomes in excess of the national median. Furthermore, the achievement scores for this group are higher than average. The no preschool group has mixed characteristics. Socioeconomically, this group is similar to the relatively advantaged children in the some preschool group but their scores are similar to those of the Head Start graduates.

The differences among the NFT Head Start graduates, children with no preschool and children with some preschool, suggest that the comparison of FT with NFT will be improved by conducting separate analyses of these groups since there are substantial differences among the NFT group's characteristics. However, the presence of large percentages of poor and minority children in the NFT groups suggests an important issue for interpretation. Since many of these children appear to be eligible for some form of compensatory education and since compensatory education programs (Title I, ESAA, State programs, etc.) are and have been widely disseminated, it is highly likely that many of the comparison children had participated in some formal compensatory education program. Furthermore, since relatively more children in the Head Start group would be eligible for these programs, it is likely that more NFT children who are Head Start graduates participated in such a program. The extent to

which this conjecture is true can not be evaluated since data concerning the participation of comparison children in compensatory programs are not available. However, given that the conjecture is true, the central implications are: (1) that the FT programs are not being compared to "traditional education" but rather to some conventional form of compensatory education with an emphasis on basic skills such as reading and/or math*; and (2) that the problem of comparing a FT program to another compensatory program is more likely to occur in the comparison of FT and NFT Head Start groups.

Comparison of the Model's Preschool Groups with Their Respective NFT Group

The comparison of the progress of a given FT group with a particular comparison group (HS, NPS or SPS) is appropriate only if the groups have similar background characteristics, that is, if the groups come from the same population.** Indeed, the analysis which follows (see Chapter Three) was designed to adjust for background differences; however, such methods are, in the author's opinion, only approximation devices. If the differences among groups are so great that they appear to come from substantially different populations (e.g., social strata) no analytic device will render the groups comparable.

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* One may argue that there is little evidence that compensatory education programs are effective; however, some recent research, notably the National Assessment of Educational Progress' report Reading in America: A Perspective on Two Assessments, The University of the State of New York, Report 1971-1972 Urban Education Program, and others suggest that compensatory programs are producing substantial progress for their participants.

** The fact that two groups have similar characteristics does not ensure that they come from the same population since groups with comparable characteristics could be created by drawing the most advantaged children from a poor group and the least advantaged children from a middle class group. Such matched groups do not provide a fair comparison (see Campbell and Erlebacher, 1971). However, these considerations are beyond the scope of this study since the characteristics of the populations from which the children in this study were drawn are not known.

In the following discussion the several Follow Through groups, Head Start, No Preschool, and Some Preschool, are compared with the respective comparison group on a basic set of variables traditionally related to school achievement. The variables include the mean Wide Range Achievement Test (WRAT) score at entry to kindergarten, median family income, and the percentage of the group who are members of a minority group. These variables were selected from those available (see Table I2-3) because individually they have been found to be related to achievement scores in past studies including studies of Follow Through, and because taken together they cover the range of important sources of variation in scores.

The values for the sponsors' groups and for the appropriate comparison group are shown in Figures 2-1, 2-2, and 2-3. Overall, the figures suggest that the FT Head Start groups, which are closely clustered around the NFT HS values on WRAT and income but vary on percent minority, are somewhat better matched than the No Preschool and Some Preschool groups. The No Preschool group ranks second on quality of match in that many sponsor NPS groups are clustered fairly close to the NFT NPS group on the WRAT and income. The sponsors' SPS groups are also clustered together but in general have lower WRAT means, lower median income, and more minority students than the NFT SPS group. Overall, these data suggest that the comparison of FT Head Start children with NFT HS is the most appropriate, that the comparison of FT and NFT children without preschool experience is appropriate for some groups but marginal or inappropriate for others, and that the comparison of FT and NFT children classified as Some Preschool may more often than not be inappropriate.

The figures show that most of the sponsors' HS groups do not differ from the NFT HS group to an important degree. On the WRAT all of the sponsors' HS group means, with the exception of the Cal Process group, fall between 23 to 35 points, that is from approximately one-half standard deviation below to one-half standard deviation above the NFT Head Start Mean.* On income, all of the groups (again with the exception of the Cal Process group) fall within approximately $1200 of the NFT Head Start

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* The values for the respective groups are presented in Table 2-2.

Figure 2-1

DISTRIBUTION OF WRAT MEANS FOR
SPONSORS' AND NFT PRESCHOOL GROUPS

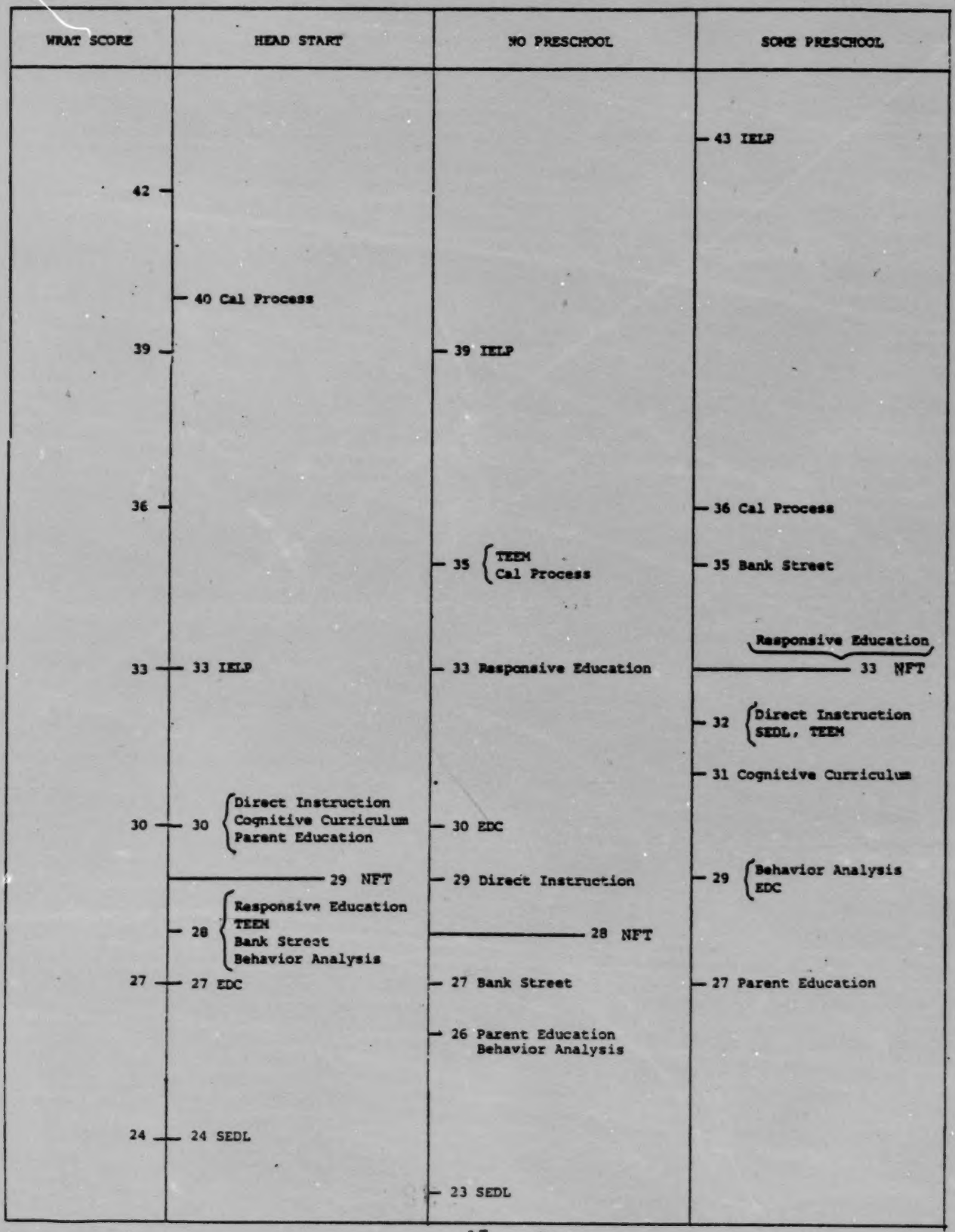


Figure 2-2

DISTRIBUTION OF MEDIAN INCOME FOR SPONSORS' AND NFT PRESCHOOL GROUPS

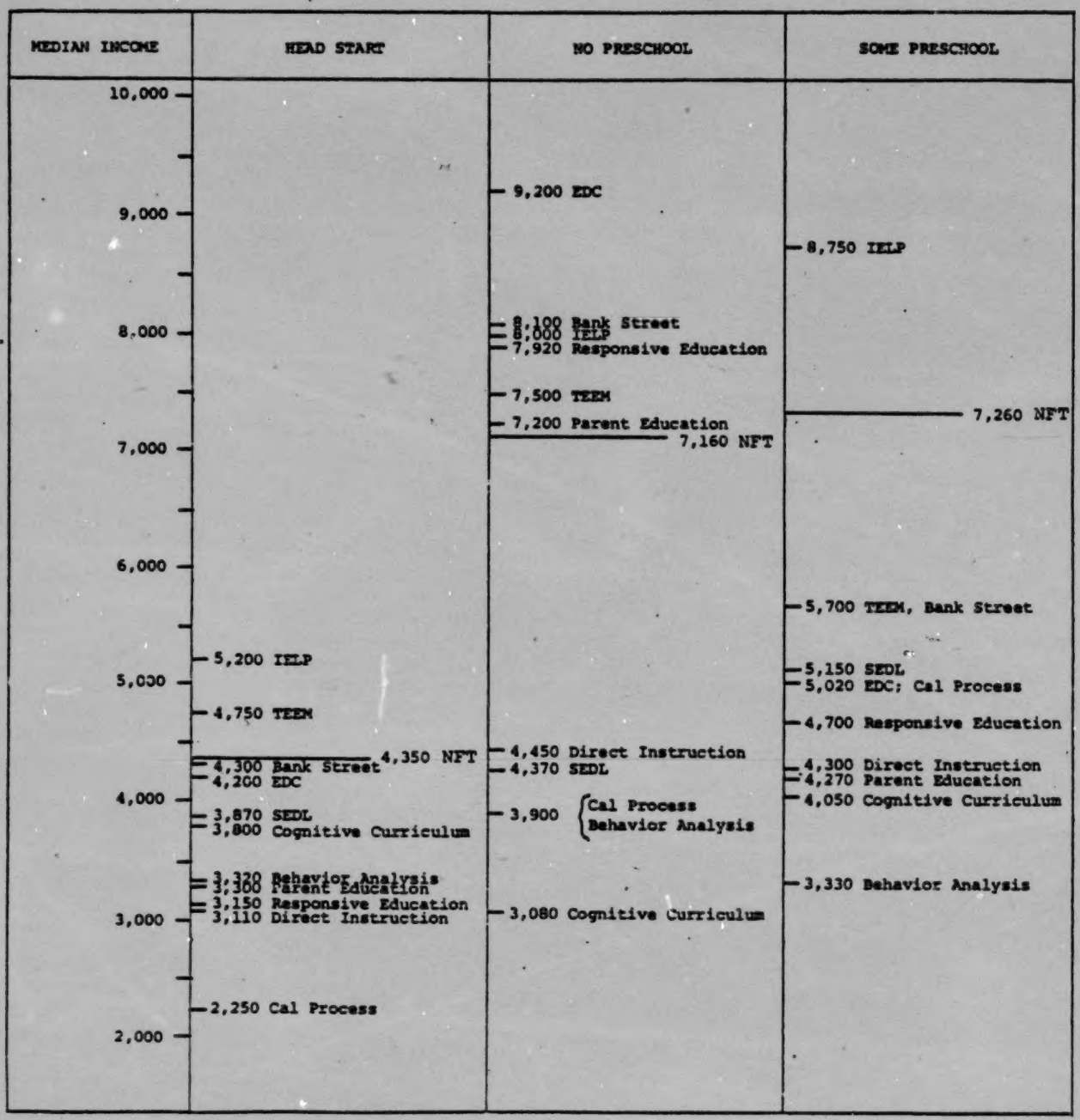
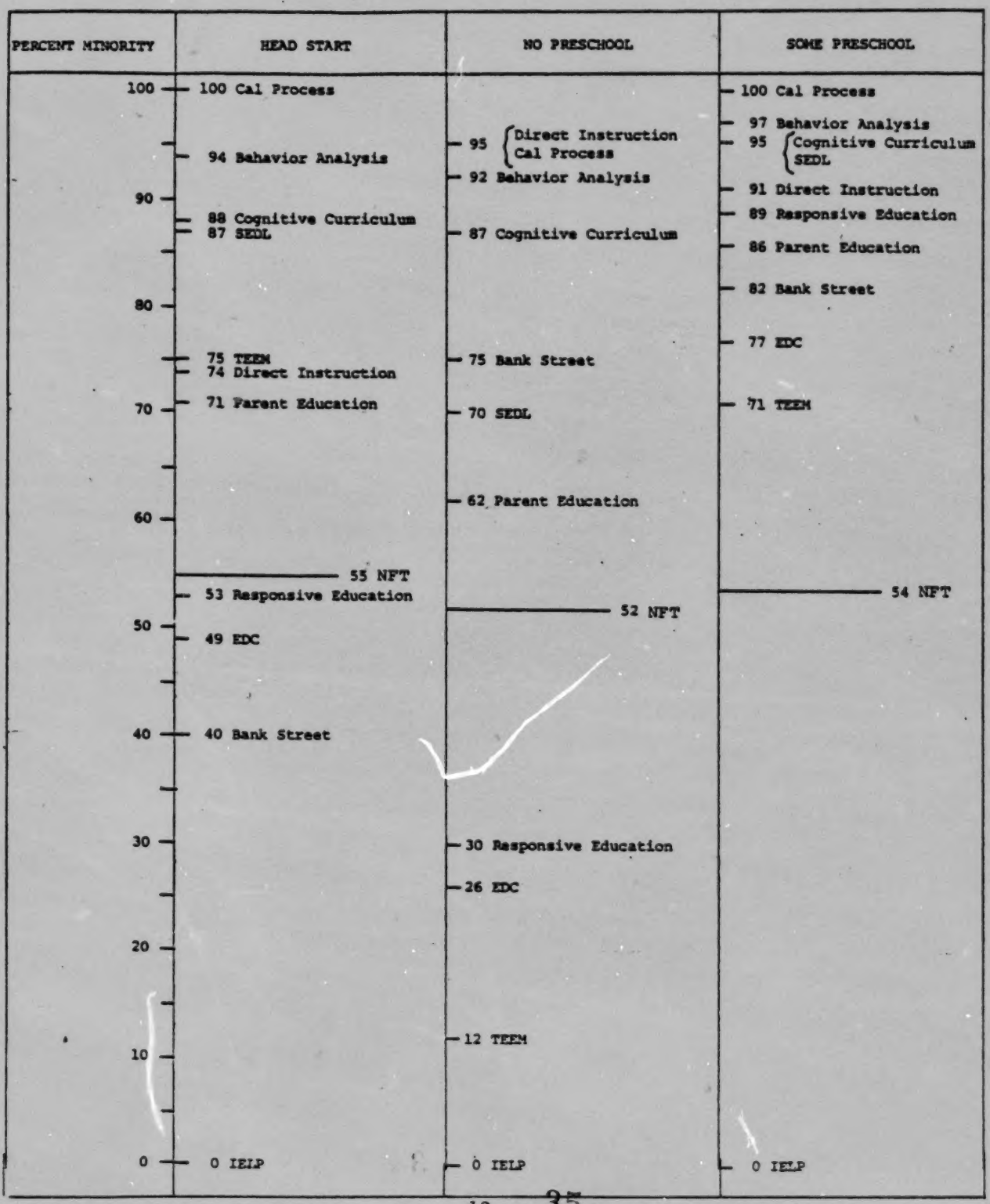


Figure 2-3

DISTRIBUTION OF PERCENT MINORITY
FOR SPONSORS' AND NFT PRESCHOOL GROUPS



median. The distribution on percentage minority is somewhat different. While the overall NFT Head Start group includes 55 percent minority children, most of the FT groups include more than 70 percent minority children. Four of the groups (Behavior Analysis, Cognitive Curriculum, SEDL, and Cal Process) include more than 85 percent minority children, while the IELP group includes no minority children. These characteristics suggest that several of the FT groups are exceptional and that the comparison of these groups with the NFT HS group is questionable. The Cal Process HS group is an unequivocal outlier. Not only is this group quite small in size but it also has the highest pretest mean, the lowest median income, and includes only minority (Black) children. Few of the other HS groups differ from the NFT HS group on variables other than percent minority. SEDL and IELP have substantially different ethnic composition and IELP has a relatively high WRAT and median income. The SEDL HS group is different from the NFT HS group in that the group includes a substantial percentage of Spanish surnamed (55 percent) and bilingual children (63 percent). The IELP HS group is also somewhat deviant in that the group includes no minority children and has the highest median income among HS groups and the second highest WRAT score. The comparison of these groups with the NFT HS group must be conducted with caution.

As noted, the FT NPS children show somewhat more deviation with respect to the NFT NPS group. On the WRAT, the FT groups are clustered fairly close to the NFT mean and all groups with the exception of the IELP group score within the range of 22 to 35 points, that is, from approximately one-half standard deviation below to one-half standard deviation above the NFT NPS mean. The median incomes of the groups form two clusters, one within $1000 of the NFT median, while the other is nearly $3000 lower. The EDC group is also an outlier with a median income at $9200; however, this value is based on a small number of children (approximately 13 children for whom income data were available). Notably, 4 of the 5 NPS groups in the low income cluster include substantially more minority children than the NFT NPS group. The remaining group, SEDL, includes 62 percent Spanish surnamed children and 66 percent bilingual children.

Several other NPS groups include fewer minority children than the NFT NPS group: Responsive Education, EDC, TEEM and IELP. As noted, both the Responsive Education and EDC NPS groups contain too few children for adequate assessment (23 and 27 children respectively). The TEEM NPS group, although low on percentage of minority students, is similar to the NFT NPS group on the other measures. The IELP NPS group does, however, appear to be an outlier. Not only does this group contain no minority children but also the group mean WRAT is the highest among the NPS groups. In addition to the IELP NPS group, the SEDL, Behavior Analysis, and Cognitive Curriculum NPS groups are substantially different from the NFT NPS group, having lower median income and substantially different ethnic composition. The comparison of these NPS groups with the NFT NPS group is questionable.

Turning to the groups with some preschool experience, the deviation between the FT groups and the NFT SPS group is even more striking, particularly on income and percentage minority. On the WRAT, all SPS groups with the exception of IELP and Responsive Education have means within the range from 27 to 40 points, that is, the range from one-half standard deviation below to one-half standardization above the NFT SPS mean. The IELP SPS group contains an insufficient number of children, only 21, to merit concern. The Responsive Education group mean is substantially below the NFT SPS mean, approximately .7 standard deviations. On income, none of the FT SPS groups have medians that are close to the NFT value. The small IELP group has a substantially higher median while the remaining FT groups have a median income which is at least $1500 lower than the NFT SPS value. The distribution on percent minority is equally deviant. Again, the small IELP SPS group is different. The group contains no minority students while the rest of the FT SPS groups contain 71 percent or more minority students. The differences in ethnic membership and median income suggest that all of the comparisons between the FT SPS groups and the NFT SPS group are questionable.

Summary and Conclusions

This discussion of the similarities and differences between the FT models' groups and the comparison groups highlights the general weakness of the research design. Although the separation of the models and

comparison children into subgroups with different preschool experience is motivated both by the expectation of different patterns of progress for these children in school and by the basic differences among the NFT groups' characteristics, this separation does not appear to uniformly improve the comparability of FT and NFT groups. In fact, the comparison of the FT and NFT children within preschool groups indicates that the children in Follow Through programs in the Some Preschool and No Preschool categories are in general more likely to be members of a minority group and poorer than comparison children with similar preschool experiences. The selection factors which have produced these differences can only be guessed at; however, the differences indicate that many FT children in these groups are from a different social stratum than comparison children.

The comparison of FT Head Start children with NFT Head Start children appears more appropriate. As noted, however, these NFT children are likely to be involved in some conventional form of compensatory education. Thus, the comparison of the Head Start groups may in fact be as biased as the comparison of NPS and SPS children.

CHAPTER THREE

LONGITUDINAL ANALYSIS STRATEGY

Introduction

The objectives of the longitudinal study can be expressed as three questions:

- When, during the course of a child's experience in a particular FT program, is he/she likely to benefit?
- Do different programs have effects in different achievement areas?
- Do program effects depend upon a child's preschool experience?

The Follow Through evaluation design constrains our ability to answer each of these questions. The question concerning the timing of a program's impact must be restricted to early versus late in the program, that is, to the periods covering kindergarten and first grades versus the period covering second and third grades. The availability of achievement data in the fall of the kindergarten year, the Wide Range Achievement Test (WRAT) and the Preschool Inventory (PSI), and in the spring of first grade, the Metropolitan Achievement Test (MAT), permits an assessment of children's progress early in the program, during kindergarten and first grade. The availability of achievement data in the spring of third grade (MAT) permits an assessment of the children's progress from the end of first grade to the end of the program in third grade. This study can not address longitudinal effects by grade level (e.g., kindergarten, first grade, second grade and third grade)* because the number of children with test data at time points

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* The selection of these time points was based on the overall availability of data ignoring models. It is thus possible that a selection of cases with other patterns of testing (e.g., fall kindergarten, spring kindergarten and spring third grade) would provide more children for a particular sponsor.

other than entry kindergarten, spring first grade and spring third grade is too small.

The definition of a program effect is also problematic. As noted in Chapter Two, the comparison of FT and NFT children, even within groups with comparable preschool experience, is often questionable because of substantial differences between the characteristics (e.g., income and percent minority) of the FT and comparison children. These differences often suggest that the FT and comparison children come from different social and/or economic strata, especially the SPS groups and many of the NPS groups.* In the judgment the authors, these differences place an undue strain on any analysis technique (ANCOVA or equivalent) that attempts to adjust outcome scores for background differences and thereby place the different groups on an equal scale for the measurement of progress.

Other research, notably Equality of Educational Opportunity (Coleman, et al., 1966) and a number of methodological papers (Campbell and Boruch, 1976; Campbell and Erlebacher, 1971) have argued persuasively that the rate of progress of relatively advantaged children on standard achievement measures is faster than that of disadvantaged children. The difference in the rate of progress across time results in an increase in the difference between groups as time increases, so called "fan spread." The methodological papers argue that fan spread and other problems associated with noncomparable treatment and comparison groups either make compensatory programs such as Follow Through look "harmful" or bias against finding effects favoring the programs. A variety of analytic techniques (Campbell and Boruch, 1975; Kenny, 1975) have been designed to yield fairer comparisons. However, the origin of the basic problem appears to be in the logic of the comparison of advantaged versus disadvantaged children (Meehl, 1970; Lord, 1967, 1969). Therefore, a logical rather than statistical or analytic solution seems appropriate.

The approach we have taken in this study is to accept a traditional, albeit flawed, analytic technique for the derivation of estimates of children's progress (i.e., regression analysis) and to change the criterion of effectiveness. In this study, progress by FT children that is either equal

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* It should be noted that other volumes of this evaluation deal with the mismatch between FT and NFT in different ways, e.g., ignoring results of poorly matched groups.

to or better than progress achieved by comparison children will be accepted as evidence of a favorable program effect. Clearly the selection of a criterion of success based on equal or better progress is not suggested by the presence of analytically insurmountable differences between all FT and NFT groups in this study. The majority of FT models' Head Start groups are similar to the NFT Head Start group and several of the FT groups with no preschool appear to be comparable to the NFT No Preschool group as well. However, many of the NFT children, especially the Head Start graduates, are likely to have participated in some other compensatory program during their kindergarten to third grade years. Thus, the FT programs probably are not being compared to "traditional" classroom experience but to some unspecified compensatory programs, many of which may emphasize basic skills. Furthermore, in light of their lack of emphasis on academic skills, it is unlikely that some FT programs would produce greater progress in academic skills than would another compensatory program which does emphasize these skills. If the children in a FT program which does not emphasize academic skills progress in these skills as much as NFT children, the FT program can be judged effective. Such a pattern of progress would lead one to wonder what the program may be accomplishing in other areas, perhaps areas which the program does emphasize but which were not measured in the evaluation.

The problems involved in the comparison of FT and NFT diminish the likelihood of finding genuinely favorable effects for any FT program. Even programs which have an explicit academic emphasis and in fact produce substantial progress for most children may appear no better than the comparison group because the comparison group has higher socioeconomic status and higher initial achievement scores. Thus, we apply the criterion of "better or equal progress" by FT children uniformly to all models.

To summarize, the availability of measures restricts the study to an exploration of children's progress during kindergarten and first grades, and during second and third grades. Progress by FT children that is at least as rapid as progress of NFT children will be viewed as a favorable outcome for the FT programs.

The question concerning program effects in different achievement areas is limited to an exploration of reading and math achievement. Measures of other areas such as self-esteem, problem solving, and language skills are not available longitudinally. We examine children's progress

in reading and math as measured by the Metropolitan Achievement Test (MAT). The MAT reading and math scores from the Primary I and Primary II batteries include the types of items and questions indicated in Table 3-1. The MAT subtest scores corresponding to Total Reading (Word Knowledge and Reading) and Total Math (Math Computations and Math Concepts plus Math Problems in Third Grade), and the subscores, Math Computation and Math Concepts will be analyzed separately.*

The question concerning effects of different programs on children with different preschool experience is also restricted by the small numbers of children within the several preschool groups (see Table 2-1). In addition, the preschool experience of the child is not differentiated by type or amount. Data concerning a child's participation in a conventional Head Start program, a Head Start planned variation program (Follow Through program in preschool), or any of a variety of other Head Start options is not available. Similarly, whether a child in the Some Preschool category participated in a day care program, a Montessori program, or another type of program is not known. Finally, the amount of time that a child participated in the program(s) is also not considered. Each of these differentiations could prove illuminating; however, information permitting differentiation is not available.

Analysis Strategy

To address these questions empirically it is necessary to monitor the changes in children's achievement across time and to compare the longitudinal patterns of change observed for a given sponsor with those observed in an appropriate comparison group. The longitudinal impact of a program can be assessed by looking at patterns, that is, the path of progress of individual children across the early interval (kindergarten and first grade) and the late interval (second and third grade). In the discussion which

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* The Total Reading score was analyzed rather than the Word Knowledge and Reading subscores because the correlation between Word Knowledge and Reading scores (approximately .80) approaches the reliability of the measures; thus little would be gained by separate analysis. The correlation between Math Computation and Math Concept subscores was, however, substantially lower (approximately .65), suggesting more variability of effects. For a discussion on limiting effect of reliability on variance estimation, see J. Nunnally, Psychometric Theory (McGraw-Hill, New York, 1967), p. 204.

Table 3-1

CONTENT OF THE READING AND MATH SUBTESTS OF
THE METROPOLITAN ACHIEVEMENT TEST (MAT)

SUBTEST	MAT Primary I First Grade	MAT Primary II Third Grade
Word Knowledge	35 picture and word matching items	50 sentence completion vocabulary items
Reading	13 picture and sentence matching items	Not Available.
	8 story completion questions	Not Available.
	21 reading comprehension or interpretation questions	45 reading comprehension or interpretation questions
Math Computations	27 items including addition, addition with carry, subtraction, 2 digit subtraction (no carry), and number sentence problems	33 items including addition, addition with carry, subtraction, subtraction with carry, multiplication, division, decimals, fractions and number sentences
Math Concepts	35 items including counting, measurement, vocabulary (same as, more, less, coin values) number systems	40 items including vocabulary (ones, tens, hundreds, more, half quart, etc.), measurement, time, calendar number systems
Math Problem Solving	Not Available.	35 problems to be read by the child involving both computations and concepts

follows, one approach to the development of patterns is presented. The reader who is not concerned with the details of the analysis technique should proceed to Chapter Four where a nontechnical account of the presentation is provided.

Construction of a Longitudinal Taxonomy

In attempting to deal with the data longitudinally, our primary focus of interest is the change in student achievement across time. For a given achievement area, the effect of interest is not a single unidimensional gain score but rather the pattern of change across a pair of intervals early and later in the program. The approach we decided to take to defining patterns of progress was taxonomic; that is, we sought to define a meaningful, representative set of categories of longitudinal patterns into which children could be uniquely classified on the basis of their educational progress. To give an extreme example, we certainly wished to distinguish between children who manifested two successive relatively large gains in reading versus those who gain relatively less than most children in two successive intervals. Both groups of children could reasonably be identified as having different longitudinal patterns of achievement.

Once constructed, the taxonomy was intended to be used as a means for comparing individual FT programs with the NFT comparison group. As noted above there are substantial differences in the composition of the FT and NFT groups with respect to key background variables. If we were to make legitimate comparisons between a given FT group and the NFT comparison group, these pre-existing differences had to be taken into account. To resolve this problem we adopted a residual gains approach.

In the residual gains approach, each NFT child's raw scores are adjusted for both background characteristics and previous educational attainments before constructing the longitudinal taxonomy. The adjustments were made in the following way. First, the comparison sample was stratified into three groups:

- Students who attended Head Start
- Students who had no preschool experience
- Students who had some unidentified types of preschool experience.

For each of these groups a separate prediction equation for spring first grade and spring third grade scores was developed using multiple regression techniques.* For the spring first grade score the predictor variables were:

- Age at entry to school
- A contrast* of boys versus girls
- Mother's education
- Income
- Occupation
- A missing data code for SES
- A contrast* of white versus black
- A contrast* of white versus Spanish surnamed or bilingual**
- Fall kindergarten WRAT
- Fall kindergarten PSI.

For the spring third grade score the predictor variables were the same as those for the spring first grade score with one exception: the spring first grade scores for reading and math (MAT Reading and Total Math) were added to the predictor set. Once again, separate regressions were run for children with Head Start experience, children with no preschool experience, and children with some unidentified preschool experience. The percentage of variance in the dependent variables accounted for by the predictor set in each of these groups for each of the achievement measures examined is presented in Table 3-2. Additional details are presented in Appendix Tables. The coding of the variables is presented in Table I3-1, the regression models are presented in Tables I3-2 to I3-9, and the correlation between the background measures and outcome measures for each of the preschool groups are shown in Tables I3-10 to I3-12.

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* See in particular, J. Cohen and P. Cohen, Applied Multiple Regression/Correlation for the Behavioral Sciences (Hillsdale, New Jersey: Lawrence Erlbaum Associates), 1975.

** The Spanish surnamed and bilingual categories were grouped in the analyses because 90 percent of the Spanish surnamed children were classified as bilingual.

Table Table 3-2

PERCENTAGE OF OUTCOME VARIANCE ACCOUNTED FOR BY PREDICTOR VARIABLES IN SPRING FIRST GRADE AND SPRING THIRD GRADE SCORES FOR NFT STUDENTS, BY PRESCHOOL STATUS

Preschool Group / Grade / Outcome	Head Start		No Preschool		Some Preschool	
	First	Third	First	Third	First	Third
Total Reading	54%	68%	35%	58%	50%	71%
Total Math	57%	68%	40%	62%	50%	68%
Math Concepts	50%	64%	37%	77%	45%	67%
Math Computations	52%	50%	32%	51%	40%	51%

It should be noted that the addition of the first grade MAT Total Reading and Total Math scores to the predictor set for spring third grade scores serves to separate gains in second and third grade from gains occurring in the kindergarten and first grade. Thus, student achievement is broken into two independent components: those realized in kindergarten and first grade, and those realized in the second and third grades. Evidence of the relative independence of the gains in these two intervals for the NFT sample is reflected in near zero correlations of spring first grade residuals with spring third grade residuals. Correlation of first grade residuals with third grade residuals was computed within each type of preschool group for each of the four outcome areas examined (i.e., Total Reading, Total Math, Math Concepts, and Math Computations). Of the twelve coefficients computed, none were significantly different from zero, the highest being .04.

The next step in the construction of the longitudinal taxonomy was the calculation of a predicted score for each NFT child on each of the outcome measures. The observed score of each child was subtracted from the predicted score to yield a "residual gain" score.* The frequency distribution of these gain scores was obtained and a trichotomy was established. The establishment of this trichotomy is the feature of this analysis which makes it taxonomic or classificatory in character. Each child was classified as falling into either the lowest third, the middle third, or the top third of the distribution depending on the sign and size of the child's residual gain score within the overall distribution of residual gain scores for the preschool group to which the child belonged. In all instances, the students in the low group all had negative residual gain scores, students in the middle group had both positive and negative residual gain scores, and students in the high group had only positive residual gain scores.

After computation of the residual gain scores and trichotomy of the NFT Preschool Groups, the next step in the analysis was to construct a longitudinal taxonomy of academic progress by crossing the kindergarten to first grade trichotomy with the first to third grade trichotomy. This process yielded a nine-fold taxonomy with categories defined as presented in Figure 3-1. Each NFT student falls into one and only one of these categories for each of the four measures examined. Each category included approximately 11 percent of the children. The distributions are shown in Table 3-3.

Figure 3-1 not only shows the taxonomy but also presents a schematic presentation of the longitudinal patterns in the form of a six point star. The three rays on the left hand side of star represent progress (residual gains) during the kindergarten and first grade interval. The three rays on the right hand side of each star represent progress during the second and

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* The mean of all residual gain scores is by definition zero, but some children's residual gains are positive and others are negative. The score represents the component of the child's progress that is independent of where he/she began as well as independent of the group mean. Presumably the between-child variation represents the differential effect of schooling on children. Some children are more favorably affected; that is, they have positive residual gains indicating that they achieved more than expected. Others are less favorably affected; that is, they have negative residual gains indicating that they achieved less than expected.

Figure 3-1

TAXONOMY AND PATTERNS OF RESIDUAL GAINS

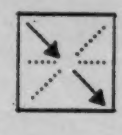
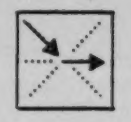
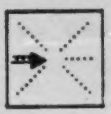
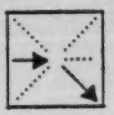
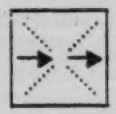
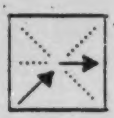
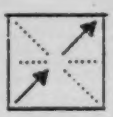
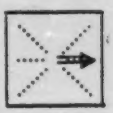
EARLY GAINS (KINDERGARTEN AND FIRST GRADES)	IGNORING LATE GAINS	LATE GAINS (SECOND AND THIRD GRADES)		
		SMALL Gain Below 35th 35th Percentile of NFT	AVERAGE Gain Between 35th and 65th Percentiles of NFT	LARGE Gain Above 65th Percentile of NFT
SMALL Gain Below 35th Percentile of NFT	Small Kindergarten and First Grade Gain	Small Early and Small Late 	Small Early and Average Late 	Small Early and Large Late
AVERAGE Gain Between 35th and 65th Percentiles of NFT	Average Kindergartan and First Grade Gain 	Average Early and Small Late 	Average Early and Average Late 	Average Early and Large Late
LARGE Gain Above 65th Percentile of NFT	Large Kindergarten and First Grade Gain	Large Early and Small Late	Large Early and Average Late 	Large Early and Large Late 
IGNORING EARLY GAINS		Small Second and Third Grade Gain	Average Second and Third Grade Gain 	Large Second and Third Grade Gain

Table 3-3

NUMBER AND PERCENTAGE OF NON FOLLOW THROUGH CHILDREN IN EACH PRESCHOOL GROUP IN EACH CATEGORY OF THE LONGITUDINAL TAXONOMY FOR EACH OUTCOME MEASURE

NON FOLLOW THROUGH			FIRST GRADE TO THIRD GRADE															
			Head Start				No Preschool				Some Preschool				Overall			
			-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	-	N 24	21	16	61	109	57	59	225	34	29	38	101	167	107	113	387
			% 14	12	9	35	17	9	9	35	12	10	13	35	15	10	10	35
		0	N 17	15	20	52	68	67	59	194	32	25	26	83	117	107	105	329
			% 10	9	11	30	11	10	9	30	11	9	9	29	10	10	9	30
		+	N 21	15	26	62	52	63	112	227	35	28	39	102	108	106	177	391
			% 12	9	15	35	8	10	17	35	12	10	14	36	10	10	16	35
			N 62	51	62	175	229	187	230	646	101	82	103	286	392	320	395	1107
			% 35	30	35		35	29	35		35	29	36		35	29	36	
	Total Math	-	N 23	21	18	62	73	71	78	222	41	27	30	98	137	119	126	382
			% 13	12	10	35	11	11	12	34	14	9	11	34	12	11	11	35
		0	N 15	18	19	52	68	62	68	198	26	27	34	87	109	107	121	337
			% 9	10	11	30	11	10	11	31	9	9	12	31	10	10	11	30
		+	N 23	18	20	61	84	61	81	226	34	29	38	101	141	108	139	388
			% 13	10	11	35	14	9	13	35	12	10	13	35	13	10	12	35
			N 61	57	57	175	225	194	227	646	101	83	102	286	387	334	386	1107
			% 34	33	33		35	30	35		35	29	36		35	30	35	
	Math Computations	-	N 21	20	20	61	73	77	75	225	40	30	32	102	134	127	127	388
			% 12	11	11	35	11	12	12	35	14	11	11	36	12	11	11	35
		0	N 19	14	18	51	67	59	67	193	24	26	32	82	110	99	117	326
			% 11	8	10	29	10	9	10	30	8	9	11	28	10	9	11	29
		+	N 21	18	24	63	85	57	86	228	37	27	38	102	143	102	148	393
			% 12	10	14	36	13	9	13	35	13	9	13	36	13	9	14	36
			N 61	52	62	175	225	193	228	646	101	83	102	286	387	328	392	1107
			% 35	30	35		35	30	35		35	29	36		35	30	35	
	Math Concepts	-	N 24	21	16	61	83	73	70	226	41	30	30	101	148	124	116	388
			% 14	12	10	35	13	11	11	35	14	11	11	35	13	11	11	35
		0	N 17	15	20	52	61	65	66	192	26	25	33	84	104	105	119	328
			% 10	9	11	30	9	10	10	30	9	9	12	30	9	10	11	30
		+	N 21	15	26	62	81	55	92	228	34	27	40	101	136	97	158	391
			% 12	9	15	35	13	9	14	35	12	9	14	35	12	9	14	35
			N 62	51	62	175	225	193	228	646	101	82	103	286	388	326	393	1107
			% 35	30	35		35	30	35		35	29	36		35	29	36	

third grade interval. The rays with a declining slope refer to the children who progressed less than did most NFT children (i.e., with negative residual gains below the 35th percentile of the appropriate NFT distribution); the rays with the horizontal slope refer to children who progressed at approximately an average rate relative to NFT (i.e., with residual gains between the 35th and 65th percentiles of the appropriate NFT distribution); and the rays with the ascending slope refer to children who progressed more than did most NFT children (i.e., with positive residual gains at or above the 65th percentile of the appropriate NFT distribution).

Following the development of the longitudinal taxonomy for the NFT groups, FT students were classified using the standards established by the NFT analysis. First, a predicted score was calculated for each FT student for each of the four achievement tests examined for both first and third grades. These predicted scores were computed using the coefficients established in the NFT analyses for children of the same preschool status and grade level. An estimate of the fit of the NFT equations for FT students was obtained by correlating the predicted with the observed scores for each FT group. The results of these computations are presented in Table I3-13. In general, these correlations are quite high, indicating an adequate fit of the NFT analytic models to the sponsors' data.

Having computed the predicted score for each FT student using the prediction equation for the appropriate preschool group, a residual gain score was computed by subtracting the predicted score from the actual raw score. The residual gain scores for each outcome for each grade level were then classified as "small," "average," or "large" using cutoff values from the appropriate NFT preschool group. Residual gain scores below the 35th percentile were classified as "small," residual gain scores between the 35th and 65th percentiles were classified as "average" and scores above the 65th percentile were classified as "large." The fall kindergarten to spring first grade classification for a given outcome measure, e.g., Total Reading, was cross classified with the spring first grade to spring third grade classification yielding a longitudinal taxonomy for the FT children as shown in Figure 3-1. These cross classifications and their marginal distributions provide the basic data for the longitudinal study and for the assessment of program effects.

Analysis

The longitudinal taxonomy provides information concerning the number and percentage of children in each sponsor's preschool group who showed different patterns of residual gains. A comparison of the distribution of pattern types for FT children versus NFT children provides a mechanism for testing for the impact of a FT sponsor's educational program. Table 3-3 presents the number and percentage of NFT children who displayed each of the nine longitudinal patterns, as well as marginal totals representing the number and percentage of children with large, average, or small residuals in the kindergarten and first grade, and second and third grade intervals considered separately. Separate tables are presented for NFT Head Start graduates, children with no preschool experience, children with some preschool experience, and for the overall NFT group. In each table, the children are evenly distributed across the nine pattern types, evidence that we have successfully broken down the children's progress between kindergarten and third grade into two relatively independent components. The NFT distributions thus provide a standard for assessing the patterns produced by the FT models. If more FT children display a given pattern relative to NFT, the pattern can be thought of as representative of the program's effects.

When the FT children for a particular model show material differences in their distribution of residual gain scores relative to the appropriate NFT comparison group, the difference is represented on the star graphs following the taxonomy shown in Figure 3-1. For FT groups who show a significantly greater proportion of children than NFT with a particular longitudinal pattern, the two appropriate rays are overlaid by arrows which connect at the center of the star. These differences are highlighted in the Appendix Tables by boxes surrounding cells on which the arrows are based. The criteria for determining whether a significant difference exists between the longitudinal patterns of FT and NFT are as follows:

1) A Chi Square (χ^2) with a probability less than or equal to .1 computed by comparing the number of FT versus NFT children in each of the nine longitudinal pattern types. χ^2 values are indicated in the Appendix Tables; and,

2) A cell for a given FT preschool group containing 25 percent of more of the children; or,

3) For the overall sponsor group, a cell containing 20 percent or more of the children.*

Some examples are presented in Figure 3-2. Cell a in Figure 3-2 indicates that many FT children (at least 25 percent of the group) progressed more than NFT during kindergarten and first grade, but progressed less during second and third grade. Cell b indicates that many FT children (at least 25 percent of the group) showed progress which was similar to that of NFT children during the kindergarten and first grade, but larger than most NFT children made during second and third grade.

The presentation of results for FT models includes: (1) schematic characterizations of patterns of gains; (2) appendix tables which present the number and percentage of children with each of the nine different patterns of gain and the percentage of children with large, average, or small residual gains for both the early and late intervals (i.e., the marginals of the basic 3x3 patterns table); and (3) a second appendix table which presents means, standard deviations and additional statistics. The schematic presentation of the results as shown in Figure 3-2 is the primary presentation vehicle. Each chart consists of sixteen cells, each of which contains the six-point star pattern. Each star represents the results for the model under consideration for a group of children with a particular preschool background for a particular achievement outcome.

The presentation also includes information about differences between FT and NFT during the kindergarten and first grade interval and the second and third grade interval, separately. When a difference is found between a FT and the NFT group for a particular interval, either kindergarten and first grades or second and third grades, a double lined arrow is shown in the star graph, again following Figure 3-1. The criteria for determining whether a difference exists between FT and NFT in their progress during either the kindergarten and first grade period or second and third grade period are:

1) At least 50% of the children in an FT preschool group must display one of the three types of residual gains for the time interval under consideration; or,

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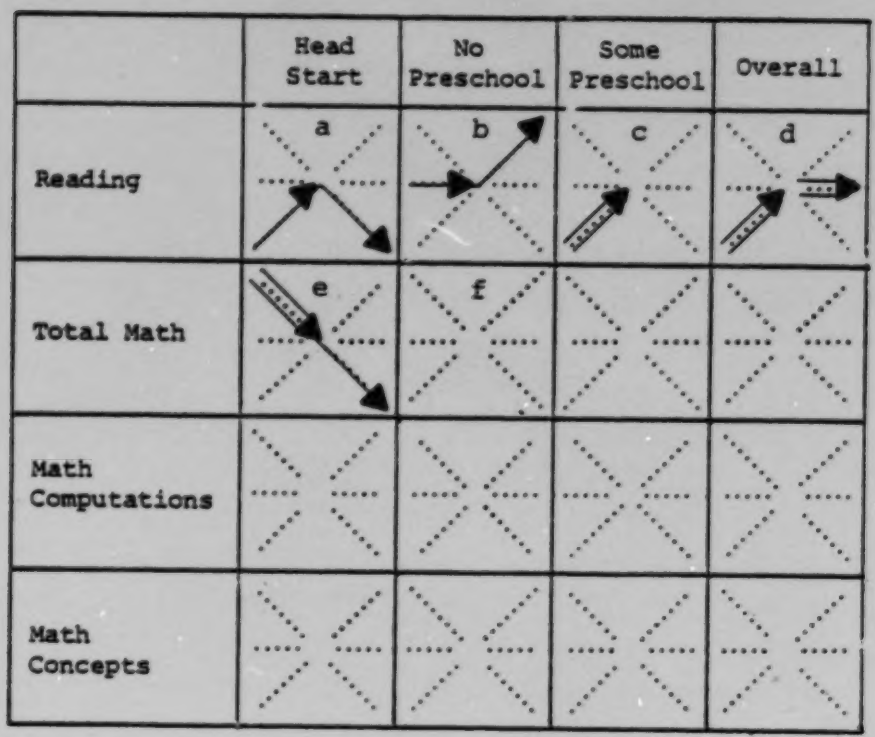
* The percentage criteria differ for the preschool versus overall groups because the overall group is substantially larger than the preschool groups.

Figure 3-2

LONGITUDINAL PATTERNS FOR A HYPOTHETICAL FOLLOW THROUGH MODEL



2) At least 45% of the overall group for the FT model under consideration must display one of the three types of residual gains for the time under consideration.

Figure 3-2 presents some examples. Cell c in Figure 3-2 indicates that most FT children (at least 50 percent of the group) showed greater progress in Reading than most NFT children during kindergarten and first grades. Cell d in Figure 3-2 indicates that at least 45 percent of the FT group showed greater progress than most NFT children during kindergarten and first grade and about average progress during second and third grade. Note, however, that these two patterns do not necessarily include the same subset of children for both intervals.

A single star graph may also indicate material differences in both longitudinal patterns and single interval patterns (kindergarten and first grade gains and second and third grade gains). Cell e in Figure 3-2, for example, indicates that the majority of FT Head Start children showed less

progress in Total Math than did most NFT children during kindergarten and first grade and that a large percentage of these children, at least 25 percent, progressed less than most NFT both early and late in the program.

Finally, the absence of differences in gains between FT and NFT is indicated as in Cell f of Figure 3-2. If the distribution of gains achieved by a FT group is similar to that achieved by the respective NFT, no pattern is shown. The absence of a pattern implies that the two groups progress at a similar rate and achieved similar residual gains. Note that this random pattern of residual gains is different from the pattern shown during the late interval in Cell d. The essential difference between these two patterns relates to the variability of the residual gains. For Cell f, the variability of FT and NFT residual gains are similar. For Cell d, during the late interval, the residual gains for the FT children would be less variable than those for NFT. That is, the gains would be more homogeneous. Since the current analysis utilizes the residual gains in a taxonomy and not for assessing the significance of differences between means, close to average residual gain and random patterns will be treated similarly, that is, as indicating no discernable difference between the progress of FT versus NFT children.

CHAPTER FOUR

FINDINGS FOR FOLLOW THROUGH MODELS

In this chapter the results of the analyses for the individual FT models are presented. For each model a brief description of the educational program, a brief description of the participating children in the three preschool groups,* and an account of the program effects on achievement measures are presented. The model descriptions** will give the reader unfamiliar with a particular model a sense of what a program is about and will enable him to interpret the findings in the context of a program's broader goals.

Before turning to the sections about individual models, three issues should be reiterated: The consequence of the small size and geographic diversity of many of the FT groups, the frequent mismatch between FT and NFT groups, and the presentation and interpretation of the findings. Many of the FT models' groups include a small number of children. Furthermore, the children included in a given group are often from several different sites and may have participated in different classrooms. Ideally, one would study site differences or at least adjust for them. However, there are insufficient numbers of children for the simultaneous study of both

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* Detailed descriptions of the groups are presented in Appendix Tables.

** The model descriptions were taken from G. Block and L. Stebbins, Education as Experimentation: A Planned Variation Model, Volume IV-B, Abt Associates Inc., Cambridge, Massachusetts, 1976. These descriptions were reviewed by representatives of the individual programs and presumably represent the goals of the programs. The text has been modified in that a few words have been deleted which are not relevant to the current account. References in the descriptions to academic achievement, reading, math, basic skills and to materials specifically related to these areas have been underlined in order to provide a sense of a program's emphasis or lack of emphasis on these areas.

preschool and site effects. Thus, in order to study the effects of the programs on children with different preschool backgrounds, the variability of site has been ignored. To protect the analysis and interpretation from faulty inference, any Head Start (HS), No Preschool (NPS), or Some Preschool (SPS) group with less than 30 children is ignored, both in the sample description and in the report of the findings. Longitudinal patterns for these small groups are included in the presentation (e.g., see Figure 5-1, NPS groups), so that their contribution to an over-all picture for a program may be appreciated. However, the patterns are shaded in the figure and are not discussed in the text.

As noted in Chapter Two, many of the FT and NFT groups appear to be mismatched on important background characteristics, e.g., income, pretest score or ethnic composition. Often the mismatch appears to be so severe that the adjustments accomplished by the analysis may be inadequate. In order to alert the reader to the comparisons in which an FT group and its NFT group appear to be poorly matched, an asterisk is placed next to the name of the group of interest, in the presentation figures.

The final issue worth reiterating is the presentation and interpretation of the findings. The reader already familiar with the presentation format should skip to the models' findings. The format is reviewed here for the nontechnical reader. The detailed results, that is, the number and percentage of children who display particular longitudinal patterns across the period from kindergarten entry to third grade exit, are presented in the appendix.* A schematic account of these results is presented in the text in the form of a star-shaped figure. The left half of each figure represents the children's progress from the beginning of kindergarten to the end of first grade, while the right half represents progress from the end of first grade to the end of third grade; that is, during the second and third grade. The figure includes:

- An upward arrow if a significant percentage of the FT children gained <u>more than</u> comparison children during an interval.

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* Also in Appendix Tables are a variety of statistics including outcome means, standard deviations, average residual gains, etc.

- A downward arrow if a significant percentage of FT children gained less than comparison children during an interval;
- A horizontal arrow if a significant percentage of FT children achieved gains which were similar to those achieved by comparison children; and,
- No arrow when there is no difference between the overall distribution of gains for FT and NFT children, that is, about equal percentages of the two groups achieved large, average, and small gains.

The double-line arrows indicate that 50 percent or more of the FT children in a preschool group or 45 percent or more of the FT children overall displayed the indicated pattern either during kindergarten and first grade or during second and third grades. The single-line arrows indicate that at least 25 percent of the FT children in a preschool group or 20 percent of the children overall displayed the longitudinal pattern shown across the period from kindergarten to third grade. The absence of a pattern is also important. If the FT children produced a distribution of gains which is similar to the NFT gains, no pattern is presented. In light of the often bad match between the FT and NFT preschool groups, especially the SPS and NPS groups, gains in an FT group which are indistinguishable from gains in NFT may be a favorable result: The FT-NFT gap has not widened.

Schematic presentations for each program are included for each preschool group for each outcome measure. An overall schematic which was derived by adding across the preschool groups is also presented for each measure. If the data suggest that a program has substantially different impacts on children with different preschool experiences, then the "overall" schematic is inappropriate and is shaded. Let us now turn to the findings for each FT model.

RESPONSIVE EDUCATION MODEL

Description of the Model

The Responsive Education Model assumes that no single theory of learning can account for all the modes in which children learn; therefore, it seeks to provide a variety of learning experiences which build on the background, culture and lifestyle the child brings into the classroom. The child in a responsive learning environment engages in exploring,

raising questions, planning, making choices and setting goals. The child discovers individual self-strengths, preferences, and liabilities. Each child develops a repertoire of abilities for building a broad and varied experiential base as well as self-confidence. The child interacts with all aspects of the educational environment, including other children. Whether individually, or within a group, the child may take on the role of leader, follower, or evaluator. These interactions can be curriculum oriented and may also involve personal and social issues. As the child grows through learning experiences, which address personal and social issues, inquiries are made into the nature of problem solving and the child takes greater responsibility for learning.

In summary, the Responsive Education Model places strong emphasis on the socio-emotional dimensions while stressing the development of cognitive skills. This is accomplished by allowing children to exercise free choice from a variety of structured alternatives.

Characteristics of the Children

About one half of the Responsive Education children were Head Start graduates and about a third had some preschool experience, leaving fewer than 30 children who had not attended preschool (see Appendix Table I4-1). Since the NPS group is too small for analysis, the discussion will be restricted to the HS and SPS groups. The greatest difference between these groups is in ethnic composition: the HS group contains about equal proportions of Black and White children, while the SPS group contains a very small percentage of White children.

As noted in Chapter Two, the Responsive Education SPS group appears to be substantially different from the NFT SPS group in income and ethnic composition as well as in WRAT scores. However, Responsive Education HS, and NFT HS are roughly comparable on most background characteristics. Although the comparison of the Responsive Education HS and NFT HS groups appears to be appropriate, the comparison of the SPS groups is questionable.

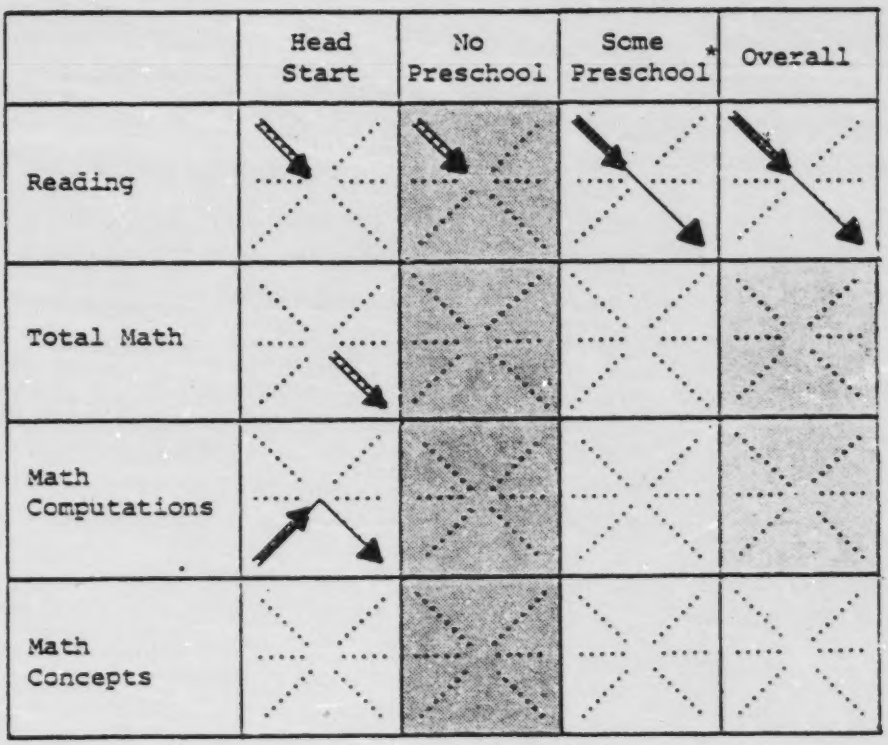
Findings

There are few differences between the patterns of gains on the math measures for the Responsive Education versus comparison children (see Figure 4-1 and Table I4-2). In reading, a majority of Responsive Education

children (58 percent) gained less than comparison children during kindergarten and first grade irrespective of preschool background. However, during second and third grade, the reading gains for most Responsive Education children are little different from those for comparison children, although a substantial percentage (22 percent), mostly SPS children, gain less than comparison children in botn kindergarten and first grades and second and third grades.

Figure 4-1

PATTERNS OF PROGRESS FOR RESPONSIVE EDUCATION CHILDREN



* Substantial differences between FT and NFT background characteristics.

The patterns on total math, math computations, and math concepts also suggest that the Responsive Education Model and the comparison group experience produce achievement gains at nearly the same rate. Overall, as well as within preschool group, there are few differences between the patterns of gains for the Responsive Education children versus comparison children. The Head Start group is the only exception.* Half of the Responsive Education HS children achieved gains on math computations which were larger than comparison children's gains during kindergarten and first grades. Later in the program, however, many of the children who achieve large gains early, achieved smaller gains.

In summary, the impact of the Responsive Education Model on achievement measures does not appear to be substantially different from the comparison group experience with the exception of its impact on early reading achievement. In reading, the majority of Responsive Education children achieved smaller gains during kindergarten and first grade than comparison children. There is also some evidence that the program may produce slightly more favorable effects for children with preschool experience other than or in addition to Head Start, however, the relatively bad match of the SPS group confounds interpretation. These data suggest that, in spite of a lack of emphasis on reading and math achievement, the Responsive Education children fare little worse than comparison children. Thus, while the programs socio-emotional and cognitive skill's emphasis may not produce substantial gains on academic achievement, this emphasis does not appear to hinder children's achievement performance.

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* The overall pattern for total math and math computations is shaded reflecting the difference between the effects for Head Start versus some preschool children.

TUCSON EARLY EDUCATION MODEL

Description of the Model

The Tucson Early Education Model (TEEM) is based on the concept that each child has a unique growth pattern with individual rates and styles of learning. Based on Hughes' (Judd and Wood, 1973) idea that formal learning should begin with the experiences young children bring to the classroom, and that the children's understanding of words and their meaning depends on the children's experiences, TEEM emphasizes a language-experience approach to cognitive development. The classroom is designed to support the use of langugage in relating experiences and learning how to learn. In summary, the model employs social reinforcement theory to achieve cognitive skill development in a relatively open classroom setting.

Characteristics of the Children

Over one half of the TEEM children are Head Start graduates; most of the remainder had no preschool, while only one in ten falls into the some preschool category (see Table I4-4). The latter groups is ignored in the discussion. The major differences between the Head Start and no preschool groups are found in ethnic composition and SES indicators. The HS group is two thirds Black, while the NPS group is nearly all White. The HS group also ranks lower in SES. The median family income of the HS group is nearly $3,000 lower than the NPS group. Moreover, the size of the average HS family is six compared to about five for NPS families. The WRAT and PSI scores for these two groups mirror their SES differences.

As noted in Chapter Two, the TEEM HS and NPS groups have characteristics which are similar to their respective NFT groups and the NFT groups appear to provide appropriate comparisons.

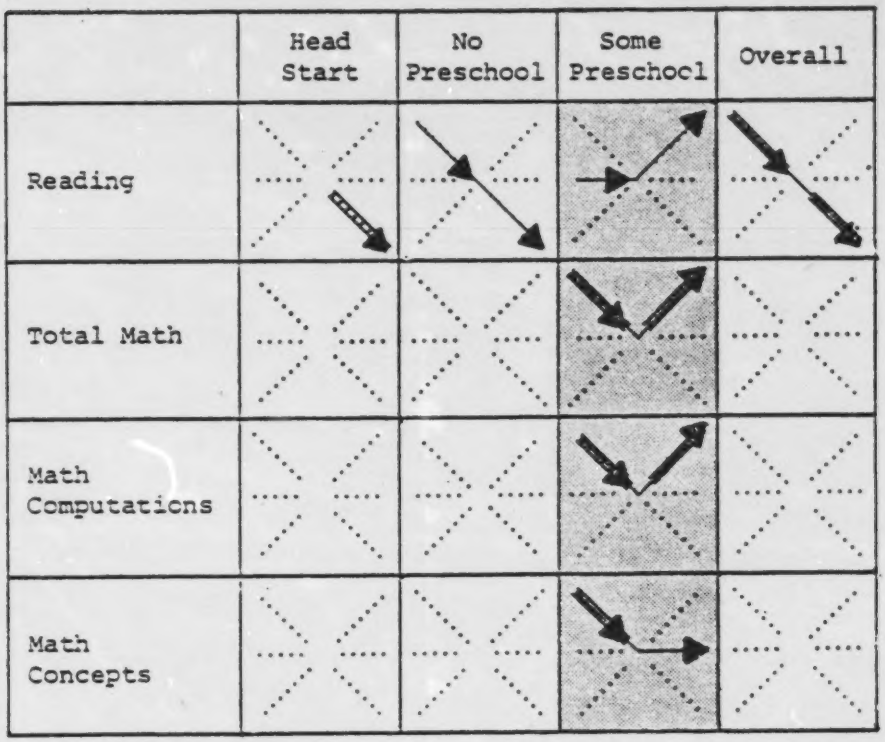
Findings

On all measures except reading, most of the TEEM children produced patterns of gains similar to those of comparison children (Figure 4-2 and Table I4-5). For reading, the overall patterns suggest that the comparison group experience may be more effective at producing reading gains. Nearly half of the TEEM children achieved smaller gains than comparison children in either the kindergarten to first grade period (45 percent) or the second to third grade period (48 percent). Furthermore, a substantial percentage

of the TEEM children (23 percent) achieved smaller reading gains than comparison children in both the kindergarten to first grade and second to third grade periods. This overall negative picture on reading is somewhat

Figure 4-2

PATTERNS OF PROGRESS FOR TUCSON EARLY EDUCATION CHILDREN



differentiated but not improved by a consideration of the different preschool groups. Most of the TEEM Head Start graduates (52 percent) gained less than the comparison children in the second and third grades while a significant percentage (28 percent) of the children with no preschool gained less than comparison children both in kindergarten and first grades, and in second and third grades. On the math measures, there are no differences between the patterns for the TEEM HS and NPS group suggesting that the impact of the TEEM program is similar to that of the comparison group experience in this area.

In summary, the impact of the TEEM program appears to be substantially different from the comparison group experience in reading but little different in math. Furthermore, the program does not appear to produce different effects for Head Start graduates versus children with no preschool experience. These findings suggest that the program's emphasis on the development of language skills as a means to acquire achievement skills may be appropriate for math achievement but not for reading achievement during the early elementary grades.

BANK STREET MODEL

Description of the Model

The Bank Street Model has the immediate goal of stimulating children's cognitive and affective development, and the long range goal of effecting community change. It emphasizes personal growth of children, parents and teachers. Academic skills and emotional social development are viewed as complementary processes and both are emphasized. The classroom is designed to provide a stable, organized environment. Within it, the children participate actively and autonomously, supported by adults who help to expand their world and sensitize them to the meaning of their experiences within it. Academic skills are acquired within the broad context of direct experiences planned to provide appropriate ways of organizing and extending the children's expressed interests. Math, reading, and language are taught as tools to carry out an investigation of these interests. Children plan their learning tasks with teachers and make autonomous choices when appropriate. A wide variety of Bank Street and commercial materials are available, such as the Bank Street readers and language stimulation materials. Children write creative stories, write their own books, read for pleasure, engage in dramatic play, music and art. Social studies are also emphasized in the Bank Street approach.

In sum, the Bank Street classroom focuses on tasks that are satisfying in terms of the child's own goals and productive for both cognitive and affective development.

Characteristics of the Children

Only one fourth of Bank Street children are Head Start graduates. One third have no preschool and the rest fall in the SPS category (see Table D4-7). The total sample size is not large, leaving fewer than thirty children in the HS sample. Consequently, the remaining discussion will be restricted to the NPS and SPS groups.

The mean age of the SPS group is nearly two months more than that of the NPS children at kindergarten entry. Most of the children in both the NPS and SPS groups are Black. The median income for the NPS group is substantially higher than the SPS group. In contradiction with the income difference, the occupational status and level of mother's education of the NPS group are lower than those of the SPS group. The NPS children also have a lower entry WRAT, suggesting that the higher income value may be spurious.

As noted in Chapter Two, the Bank Street NPS group's characteristics are similar to the NFT NPS group; however, the SPS group has a substantially lower income and more minority students than the NFT SPS group. The comparison of the SPS groups is questionable.

Findings

The Bank Street program appears to produce different patterns of gains depending on a child's preschool background* (Figure 4-3 and Table D4-8). Children classified as having had some preschool show patterns on all achievement measures which are no different from comparison children with similar preschool backgrounds. However, most of the Bank Street children with no preschool experience achieve gains on all three math measures during kindergarten and first grade which are larger than gains of comparison children. During second and third grade the pattern is reversed; most of these children achieve smaller gain than comparison children. The pattern in reading achievement gains for these children is also somewhat different. Many Bank Street children with no preschool experience (29 percent) gain as much in reading achievement during kindergarten and first grade as comparison children but gain less during second and third grades.

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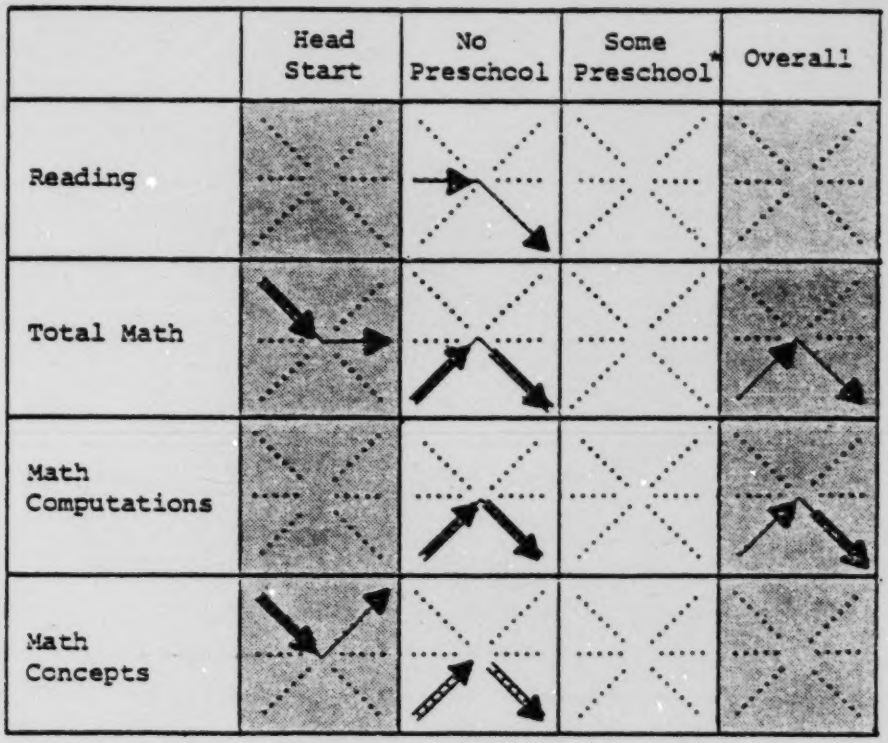
* The overall patterns for the outcome measures are shaded to reflect the difference between the patterns for children with no preschool versus children with some preschool experience.

Figure 4-3

PATTERNS OF PROGRESS FOR BANK STREET CHILDREN



* Substantial differences between FT and NFT background characteristics.

The Bank Street program appears to result in favorable progress for children with no preschool experience, particularly in math during kindergarten and first grade, so that these children achieve larger gains than comparison children. However, the advantages accrued during this early period appear to be lost during second and third grade. Bank Street children with some preschool experience achieve gains which are similar to comparison children throughout the course of the program. Although it is not possible given the information available to determine whether, the different patterns of progress for Bank Street's NPS versus SPS children are a consequence of the program itself or whether the differences are caused by other spurious and uncontrolled factors, the findings suggest

that while the child with no preschool experience may show more dramatic progress early in this program, the child with some preschool experience has a greater likelihood of showing a pattern of sustained progress not unlike his/her more advantaged peers. Thus, the Bank Street program may materially build on the child's preschool experience.

DIRECT INSTRUCTION MODEL

Description of the Model

The Direct Instruction Model is a behaviorally oriented educational program. It utilizes a tightly controlled instructional methodology and highly structured teaching materials. Its aim is to accelerate the learning of disadvantaged children in reading, language, and arithmetic. Although the instruction is programmed, the emphasis is placed on the children's learning intelligent behavior rather than specific pieces of information by rote memorization. The Direct Instruction approach uses a fast moving series of programmed questions and answers. Teachers present specified questions to elicit a verbal response from a child. Proper responses are reinforced and wrong answers are corrected according to specified procedures. These questions, answers, and corrections procedures are contained in the Direct Instructional System in Arithmetic and Reading (DISTAR ©) materials published by Science Research Associates (SRA). Non-core subjects are generally introduced after mastery of basic skills.

In sum, this model is designed to help children achieve quantifiable objectives in the basic skills of reading, arithmetic, and language through the application of behaviorist principles to instructional methodologies and materials.

Characteristics of the Children

The Direct Instruction groups vary substantially in size. The HS group includes nearly two thirds of the children, twice as many as the SPS group, leaving less than 10 percent of the children (18 children in all) in the NPS group (see Table I4-10). This small NPS group will be ignored in the discussion. The Direct Instruction HS and SPS groups contain mostly minority children and have low median income. The characteristics of these groups are, in general, quite similar.

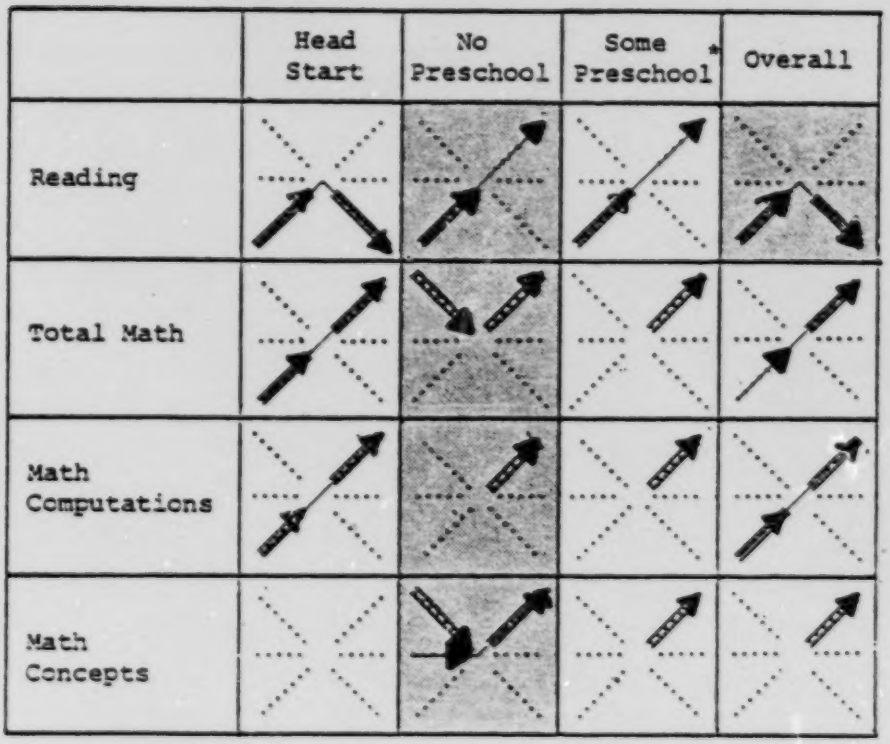
As noted in Chapter Two, the Direct Instruction and NFT HS groups are comparable. However, the Direct Instruction SPS group appears to be substantially lower than the NFT SPS group in SES. The approximately $3,000 difference on median income and the fact that over 90 percent of the Direct Instruction children are members of a minority group versus only 54 percent of the NFT SPS group, suggest that the two groups make a less than ideal comparison.

Findings

The Direct Instruction children show consistent patterns of achievement gains which are substantially different from the patterns found for comparison children (see Figure 4-4 and Table I4-11). Furthermore, the patterns of gains are highly favorable in math achievement, and in reading achievement they are favorable but mainly in kindergarten and first grade.

Figure 4-4

PATTERNS OF PROGRESS FOR DIRECT INSTRUCTION CHILDREN



* Substantial differences between FT and NFT background characteristics.

In reading the majority of Direct Instruction children (61 percent) gain more than comparison children early in the program. Later in the program, the children's gains on reading vary depending on their preschool background. A substantial percentage of the Head Start graduates (61 percent) gain less than comparison children while many of the children with some preschool (28 percent) gain as much or more than the comparison children, during second and third grade.

On the math measures the patterns of achievement gains for Direct Instruction children are even more favorable and consistent. Most Direct Instruction children, regardless of preschool background, achieved larger gains than comparison children on total math, math computations, and math concepts. Furthermore, on total math and math computations, a substantial percentage of the children gained more than comparison children during both the early and later periods.

In general, the Direct Instruction program appears to be especially effective in producing achievement gains in math and also appears to be substantially more effective than the comparison group experience in producing gains in reading during kindergarten and first grades. The favorable effects of the program do not appear to depend on the preschool experience of the child, thus, the direct emphasis of this program appears to be genuinely effective.

BEHAVIOR ANALYSIS MODEL

Description of the Model

The Behavior Analysis (BA) Model recommends a highly structured yet flexible approach. Its primary objective is the children's mastery of reading, arithmetic, handwriting, and spelling skills. The program includes aspects of team teaching, non-graded classrooms, programmed instruction, individualized teaching, and a token reinforcement system. The result is an education system which unites professional educators, para-professionals, and parents in the teaching process.

As an instructional system, BA follows a standard but flexible pattern. The BA program gives primary emphasis to the basic academic skills of reading, arithmetic and language arts in the primary grades.

This emphasis does not imply that music, science, art and social studies are unimportant. It only asserts the primary importance of the core subjects as a necessary foundation for success and achievement throughout school.

Characteristics of the Children

Over half of the children in the BA program are Head Start graduates, a fourth had no preschool, and the remainder, about one in five, had some preschool (see Table I4-13). The groups are very similar in ethnic composition and are nearly totally Black. The three groups are also very comparable with respect to SES.

As noted in Chapter Two, the comparison and BA HS groups are similar, although the BA group includes substantially more minority children than the former group. The BA NPS and SPS groups differ substantially from their respective comparison group. Both BA groups have substantially more minority students and median incomes which are more than $3,000 below the respective NFT group. The comparison of the BA and NFT Head Start groups appears to be marginally appropriate. However, the comparison of the BA, NPS and SPS groups with their respective NFT group is questionable.

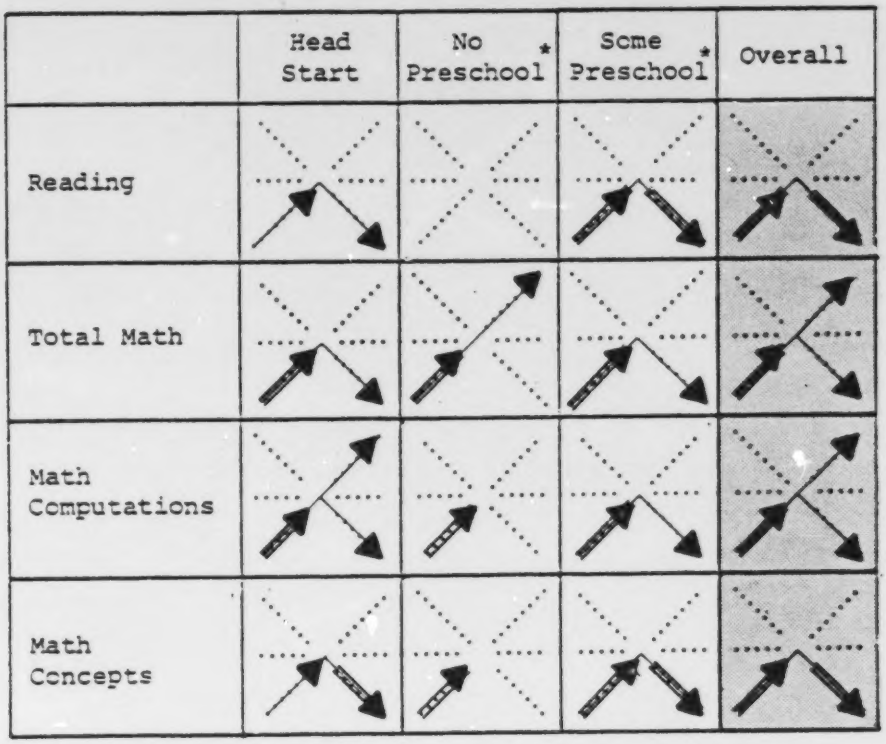
Findings

The patterns of gains for children in the Behavior Analysis (BA) program indicate that most children gain more than comparison children early in the program but that many children who benefit early gain less than comparison children during second and third grades (see Figure 4-5 and Table I4-14).

Early in the program most BA children gain more than comparison children irrespective of preschool group and outcome measure. During the second and third grade the impact of the BA program is mixed but generally less favorable. On reading and math concepts, a substantial percentage of the BA children gain less than comparison children. On total math and math computation, the patterns of progress late in the program appear to depend on the child's preschool experience. On total math, many of the BA Head Start graduates who showed substantial gain early in the program

Figure 4-5

PATTERNS OF PROGRESS FOR BEHAVIOR ANALYSIS CHILDREN



* Substantial differences between FT and NFT background characteristics.

gain less than comparison children during second and third grades. A similar percentage of the children with no preschool (26 percent) achieve larger gains than comparison children both early and late in the program. The patterns on math computations are even more complex. A third of the BA Head Start graduates gain more than comparison children on math computations both early and late in the program. An equally large group of these children gain less than comparison children during this period. Finally, the children with no preschool experience progress as much as comparison children during second and third grades.

In general, the BA program is very successful during kindergarten and first grade, but substantially less successful during second and third grades. A majority or near majority of the children benefit irrespective of preschool background and outcome measure during kindergarten and first grades. During second and third grades, the program impacts are mixed. A few children, mostly Head Start graduates, gain more than comparison children on math computations, while the children with no preschool tend to maintain the gains achieved early. Aside from these favorable findings, the program does not appear to be as effective at producing achievement gains during second and third grades as it does during kindergarten and first grade. The differences between program impacts early versus late suggest that some aspect of the model, perhaps the token reward system, may be differentially effective depending on the experience of the child in school. However, during kindergarten and first grade this model appears to be as effective at producing academic progress as any of the Follow Through models.

COGNITIVELY ORIENTED CURRICULUM MODEL

Description of the Model

The Cognitive Curriculum is a developmental model, based in part on developmental theory and cognitive structures as defined by Piaget. The focus is on developing children's ability to reason. Goals for the individual children include development of skills in initiating and sustaining independent activity, defining and solving problems, articulating thoughts through language, assuming responsibility for decisions and actions, and working cooperatively with others to make decisions. The approach is designed to provide experiences through which children can develop their conceptual and reasoning processes, as well as their competencies in academic areas. The model provides a framework for structuring the classroom and for arranging and sequencing equipment and material in learning centers. These centers focus on math, science, reading, social studies, art, and on interests such as housekeeping, construction, or puzzles. Dion reading, Nuffield and Cusinaire math, American Association for the Advancement of Science (AAID) and Science Curriculum Improvement Study (SCIS) science materials are used. Children choose their activities and work with teachers in small groups. In summary, this is a cognitively oriented curriculum which has both structured and unstructured components.

Characteristics of the Children

The number of children in Cognitive Curriculum program with complete data is relatively small, and only the Head Start group contains a sufficient number of children for analysis (see Appendix Table I4-16). This group contains nearly all minority children, is economically disadvantaged, and, as noted in Chapter Two, is similar to the NFT HS group with the exception of the substantially higher percentage of minority students. Thus, the comparison of the Cognitive Curriculum and NFT HS groups is marginally appropriate.

Findings

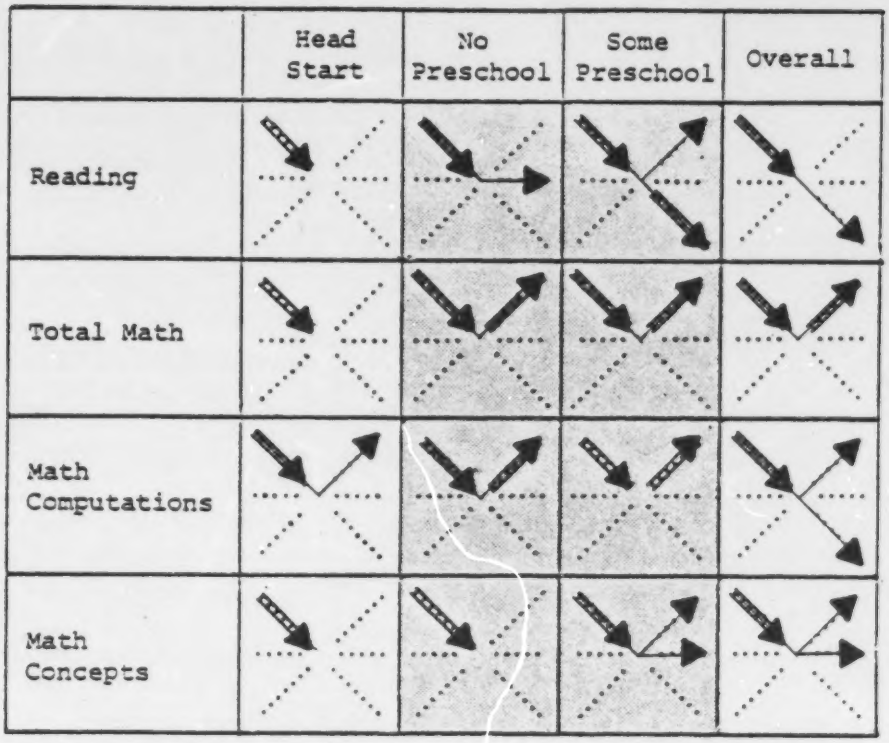
Because of the small numbers of children in the Cognitive Curriculum NPS and SPS groups, we must rely on the Head Start graduates and on the overall patterns. The patterns of gains for these children are very different from those of comparison children (see Figure 4-6 and Appendix Table I4-17). The patterns suggest, in general, that the program is less effective than the comparison group experience at producing gains in reading, especially during kindergarten and first grade, but that the program may be more effective for some children in math achievement during the second and third grades.

Most Cognitive Curriculum children (59 percent or more) achieve smaller gains than comparison children early in the program, irrespective of measure. Later, during second and third grades, some children who gained less than comparison children in kindergarten and first grades also gain less in second and third grades. The Cognitive Curriculum thus appears to be less effective at producing achievement gains than the comparison group experience, particularly early in the program.

During second and third grades, the Cognitive Curriculum effects on math measures are more favorable, but quite heterogeneous. On Total Math, most children (45 percent) gain more than comparison children late in the program. On Math Concepts a similar pattern is found. Most children who showed early losses relative to NFT gain as much or more than comparison children later in the program. The pattern for Math Computations also shows that a substantial percentage of children who gained less than comparison

Figure 4-6

PATTERNS OF PROGRESS FOR COGNITIVE CURRICULUM CHILDREN



* Substantial differences between FT and NFT background characteristics.

children during kindergarten and first grade recoup their losses later in the program by gaining more than comparison children. The math computation pattern also shows that a substantial percentage of children (20 percent) gained less than comparison children both early and later in the program.

In general, the Cognitive Curriculum appears to be less effective at producing achievement gains during kindergarten and first grade than the comparison group experience. Later, the program appears to have a heterogeneous impact in math. However, during this later period a substantial percentage of the Cognitive Curriculum children gain more than comparison children. It may be overly optimistic to think that the favorable progress of the Cognitive Curriculum children late in the program is indicative of future progress. However, the obtained patterns in math suggest that the program's objective of developing conceptual and reasoning processes may have been achieved at least for some children.

PARENT EDUCATION MODEL

Description of the Model

The Parent Education Model focuses on motivating parents to be primary educators of their children. For each class, two parents serve as teaching aides in the classroom and also visit the parents of all the children in the class, teaching them to teach their children. These parents also assist other parents with personal needs and problems.

Basic to this model is the belief that parents, since they are uniquely qualified to guide their children's emotional and intellectual development, play a critical role in their children's education. Accordingly, this model seeks to motivate parents to participate directly in their child's education both in the classroom and at home. The Parent Education Model does not enunciate specific achievement goals for children, nor does it recommend a particular classroom curriculum or teaching strategy; this model focuses exclusively on involving parents as equal partners in the educational process.

In summary, this model seeks to teach parents, through a home-visit cycle, to cope successfully, to establish a home environment receptive to learning, to participate actively in their children's education, and to promote their children's self-esteem and learning abilities.

Characteristics of the Children

The Parent Education children are evenly distributed across the three preschool groups (See Appendix Table I4-19). The Head Start group is slightly older than the other children. However, the major difference among the groups is found in ethnic mix. Each group includes a large number of Black children but the HS and SPS groups include a majority of Black students while the NPS group includes a smaller proportion of Black children and a larger proportion of Spanish surnamed children. The groups also differ on SES indicators. The HS and SPS median incomes are $3,000 lower than that of the NPS group.

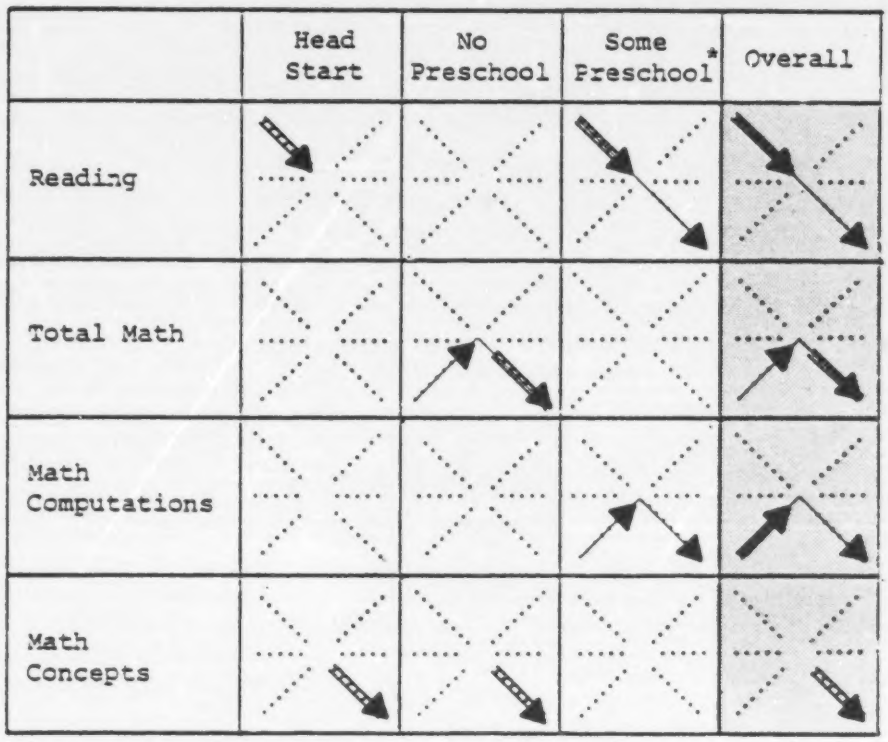
As noted in Chapter Two, both the Parent Education HS and NPS groups are quite similar to the respective comparison groups and appear to allow for reasonable comparison. However, the Parent Education SPS group has a median income which is $3,000 below the NFT SPS group and includes nearly all minority children. The comparison of the progress of the relatively advantaged NFT SPS group and the Parent Education SPS group is questionable.

Findings

There are a number of differences between the patterns of gains for the Parent Education children versus comparison children (see Figure 4-7 and Appendix Table I4-20). However, the differences are not uniform across preschool group or outcome area. The majority of the children gained less than comparison children in reading early in the program and in total math and math concepts late in the program. Many children gained more than comparison children in math computations early in the program. However, a significant percentage of the children show a pattern of larger gains early followed by smaller gains later.

Figure 4-7

PATTERNS OF PROGRESS FOR PARENT EDUCATION CHILDREN



* Substantial differences between FT and NFT background characteristics.

In general, the impacts of the Parent Education program do not appear to be consistent either for children with particular preschool experience or for particular outcome measures. Across groups and outcome measures, however, the impacts of the program appear to be only slightly different from the comparison group experience. This diversity of impact may reflect the program's emphasis on parents as an educational vehicle rather than an emphasis on specific achievement goals. Thus, parents in different sites may collectively or individually emphasize different achievement goals. Whether variability of emphasis or other factors accounts for the diversity of impact can not be determined with the available data.

EDC OPEN EDUCATION FOLLOW THROUGH PROGRAM

Description of the Model*

The EDC model is predicated on the notion that learning, particularly cognitive learning, occurs best when children are offered a wide range of materials and problems to investigate within an open, supportive environment. According to this sponsor, a child's ability to learn depends in part on the opportunities and experiences provided by the educational setting. The EDC approach is operationalized by sponsor advisory teams who work with parents, teachers, and school administrators in each site to help realize the EDC open-education philosophy. This advisory team assists in setting up classrooms and selecting a variety of books and materials from which local educators can choose.

The sponsor believes that there is no uniform way to teach reading, writing, or arithmetic skills and no uniform timetable for all children to follow. Children are not compared with other children and do not receive standardized tests.

Since the sponsor does not prescribe a detailed instructional model and feels that the open classroom philosophy is appropriate for all voluntary teachers, this model demands a highly creative and resourceful teacher and is perhaps the most teacher-dependent of the Follow Through models.

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* The sponsor comments that, " . . . the emphasis within the last three years has been in two major areas: (1) parent growth and involvement; and (2) teacher development in implementation of an open education approach to learning and curriculum development." Hilliard, G. R. Communication to Mary M. Kennedy, U.S. Office of Education, February 6, 1976.

Characteristics of the Children

About one half of the EDC children fall into the some preschool category, about one-third are Head Start graduates, and the remaining children (27 in all) had no preschool experiences (see Appendix Table I4-22). The latter group is ignored in the discussion. The ethnic composition of the HS and SPS groups is very different. The HS group includes Black and White children in nearly equal proportions, while in the SPS group, Black children outnumber White about four to one.

As noted in Chapter II, the EDC and NFT HS groups are quite comparable. Again, the sponsor's SPS group is very different from the NFT SPS group. The median income for the EDC SPS group is $2,000 lower than the NFT SPS group and the EDC group includes 77% versus 54% minority children. The comparison of those two SPS groups is thus somewhat questionable.

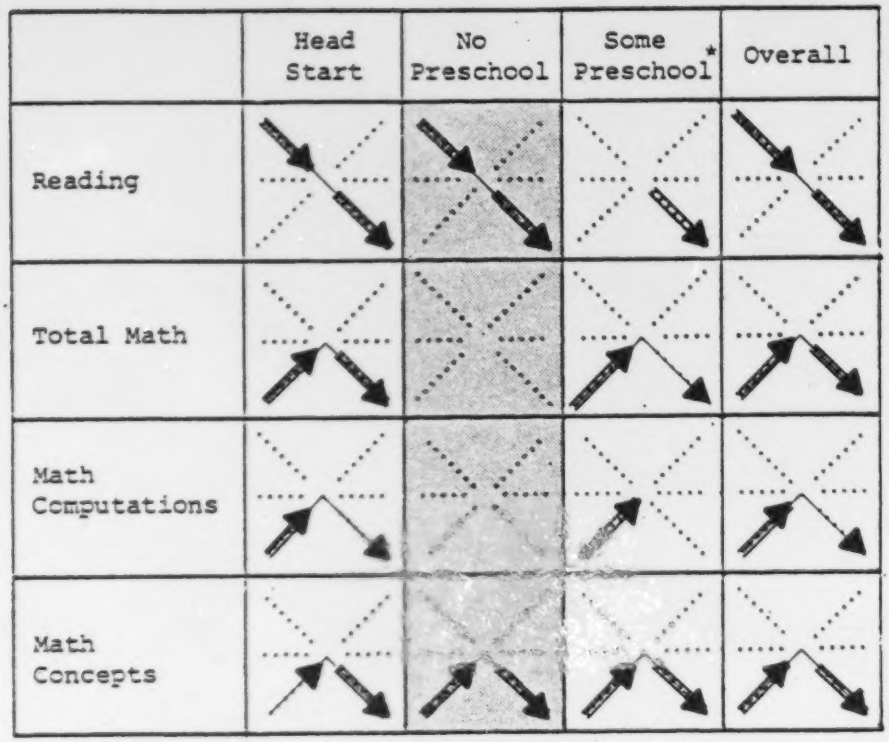
Findings

The patterns of gains for the EDC children are different from comparison children and vary depending on outcome area (see Figure 4-8 and Appendix Table I4-23). However, the results are relatively uniform for the HS and SPS groups. Most of EDC's children achieve smaller gains than comparison children in reading both early and late in the program. The patterns for math measures are different. The patterns indicate larger gains than comparison children for most EDC comparison children on total math and math computations during kindergarten and first grade but smaller gains for most children on total math and math concepts during second and third grade.

Overall, the EDC program appears to produce substantially smaller gains in reading than the comparison group experiences both early and late in the program. The program does, however, appear to produce substantial early gains in math computations. However, many children who achieve larger math gains early achieve smaller gains later. The findings suggest that an open classroom approach may be more effective than a "traditional" classroom experience at producing achievement gains in math during kindergarten and first grade and that the program is not nearly as effective in reading or with older children during second and third grades.

Figure 4-8

PATTERNS OF PROGRESS FOR EDC CHILDREN



* Substantial differences between FT and NFT background characteristics.

INDIVIDUALIZED EARLY LEARNING PROGRAM

Description of the Model

The IELP model rests on the concept that instruction should be geared to the individual's needs and stages of cognitive development. The approach is structured and emphasizes achievement in reading, language, and math. The kindergarten program provides tasks and learning materials to enhance mastery of developmental Piagetian processes. This approach continues in the primary grades. Materials for use during "free time" when the children select their own activities are designed with the sponsor's educational goals in mind. The sponsor provides prepared sequential instructional materials in reading and math. The major goal of this approach is to foster the child's academic achievement by individualizing instruction. Children also are expected to learn to direct and evaluate their own progress.

Characteristics of the Children

The IELP HS and NPS groups are comparable in size, while the sample of children in the SPS group is quite small and included fewer than 30 children (see Appendix Table I4-25). Both the IELP Head Start and no preschool groups are atypical of FT groups; they include only White children, and have relatively high median incomes and WRAT scores at entry to school. The appropriateness of the comparison of these groups, the IELP HS and NPS group, with the respect NFT group, is questionable.

Findings

The patterns of gains for the children in the IELP are different from those of comparison children (see Figure 4-9 and Appendix Table 4-26). However, the impact of the program varies depending on the child's preschool experience. In general, the program appears to be somewhat more effective for children with no preschool mostly during kindergarten and first grade. For Head Start graduates, there are few differences between IELP and comparison children.

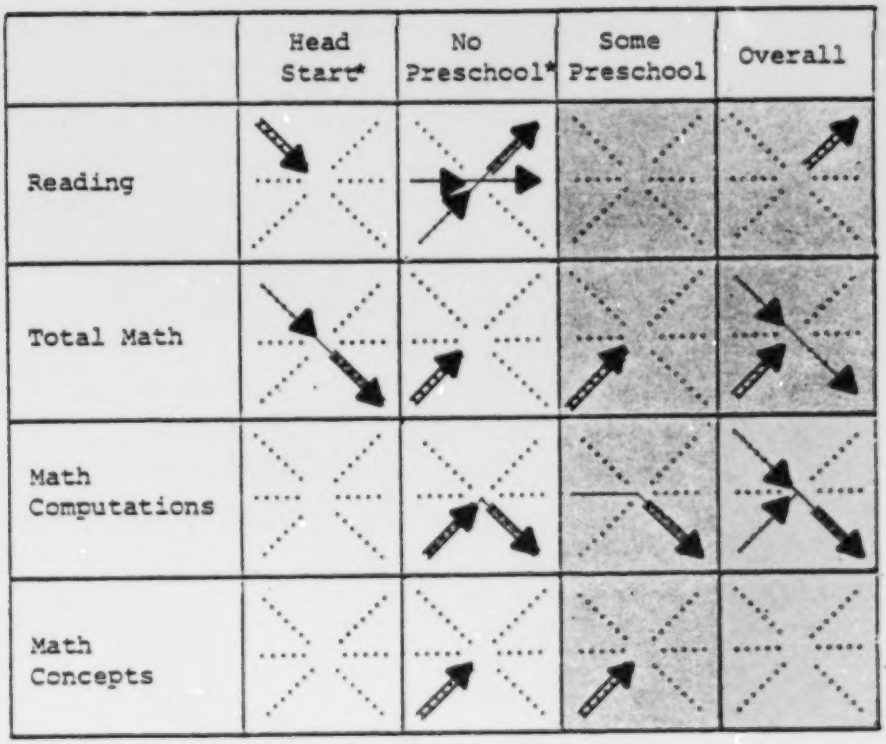
Most of the HS children gained less than comparison children on reading early in the program and on total math later in the program. However, the fact that IELP has not moved these children ahead is not surprising. This group had the highest income and entry achievement

to other groups, these children had less to gain since their scores were already high at entry to the program in kindergarten. At the end of third grade, the IELP Head Start group scored at or above the overall comparison group mean indicating that the program was able to maintain the relatively high status of its Head Start group (see Appendix Table 4-27).

The patterns for IELP children with no preschool are more favorable. Many of these children achieved larger gains than comparison children on math measures, especially during kindergarten and first grade. Many of the children (50 percent) also achieved large gains on reading during second and third grade, and some of these children (33 percent) gained more than comparison children both early and late in the program. The substantial gain of this group is notable since the reading area shows very few favorable impacts.

Figure 4-9

PATTERNS OF PROGRESS FOR IELP CHILDREN



* Substantial differences between FT and NFT background characteristics.

The only unfavorable impacts for the children with no preschool are found on math computations during second and third grade. A majority of these children gain less than comparison children during this period. Still, the mean raw score for the group is above the overall NFT group average (see Appendix Table I4-27).

In general, the IELP appears to be especially effective for the children with no preschool, especially in math achievement. The Head Start graduates in the IELP fare no better than they would be expected to in a comparison classroom; however, the program appears to have maintained the relatively high status of this atypical group.

Since the children in the IELP sample are exceptional in several respects, the findings have limited utility with respect to generalization. The IELP children are not typical of FT children in general. The preschool groups are 100 percent White and are outliers on both income and

pre-test measures. This biased sample of children is likely a consequence of the special selection criteria for inclusion in this study. The findings presented here, thus, can not be construed as representative of program impact that might be found given a less advantaged group.

LANGUAGE DEVELOPMENT (BILINGUAL EDUCATION) APPROACH (SEDL)

Description of the Model

The Language Development (Bilingual Education) Approach (SEDL) stresses a developmental approach designed for the particular needs of children whose primary language is not English. Each SEDL classroom follows one of two distinct instructional patterns: the bilingual classroom where approximately three-quarters of the children are Spanish-speaking; and the English as a second language (ESL) classroom for children of Spanish, French, and Afro-American descent who may speak a dialect form of English. Both instructional forms assume that language is the child's main tool for dealing with the environment and acquiring cognitive and noncognitive skills, and many classroom activities are designed to promote language development. Dual language skills are stressed in most curriculum areas. Sponsor-developed instructional materials designed to help the child feel important, are used to develop sensory, perceptual, reading, reasoning, and thinking skills. These SEDL materials utilize sequencing procedures aimed at developing a hierarchy of thinking processes, specific terminology, and symbols. In the bilingual classroom model, the English-speaking children learn Spanish and the Spanish-speakers learn English. In the English as a second language model, the children who speak an English dialect learn standard American English. These two models assume two basic SEDL premises which are embodied in their materials: (1) that learning in a second language is easier for the child who has first learned to conceptualize in his native language and (2) that positive emphasis on the child's native language and culture is essential to the development of a positive self-image and cognitive development.

The focus and emphasis of the SEDL model changes from year to year as children become more acquainted with the languages and cultures of their peers. In kindergarten, the focus is on developing the children's motor, visual, and auditory skills while they learn the syntax of English. In

first grade, the goal is to develop the children's oral language and reading proficiency (in both their first language and in English when appropriate, e.g., the bilingual classroom). The cultural component, which includes experiences within the family, is also included in the first grade curriculum. In second grade, the emphasis on language and reading proficiency is continued and the cultural component is extended to other families in the community. By third grade, the cultural component focuses on many cultures and many communities.

Characteristics of the Children

The three SEDL preschool groups are similar in size (see Appendix Table I4-28). Each group includes approximately 60 percent Spanish surnamed children, 40 percent of the children have a first language other than English and approximately 64 percent of the children are bilingual. Thus the program appears to be serving the intended target group.

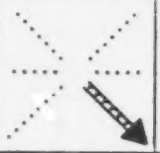
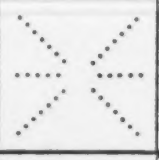
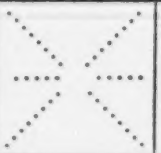
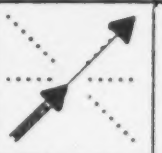
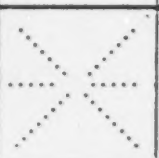
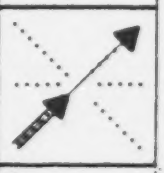
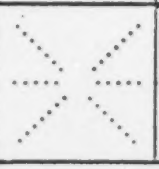
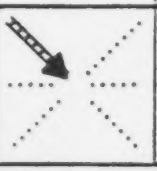
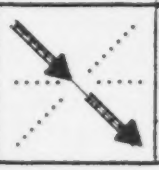
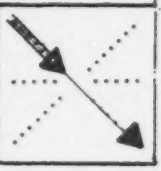
Clearly, the SEDL program is reaching a group of children who are substantially different from the other FT sponsors and from the NFT comparison group. The appropriateness of the comparison of the progress of SEDL children with NFT children is highly questionable since many of the SEDL children come from a substantially different cultural background than the majority of comparison children.

Findings

The patterns of gains for the children in the SEDL program are somewhat different from comparison children (see Table 4-10 and Appendix Table I4-29). The benefits that the program produces are restricted to total math and math computations and occur early for Head Start graduates during kindergarten and first grades, and later for children with no preschool during second and third grades. The effect of the program on reading is little different from the comparison experience, although a majority of the Head Start graduates gain less than comparison children during second and third grades. On math concepts, most children progress somewhat less than comparison children early in the program, while the children with some preschool gain less than comparison children, both early and late in the program.

Figure 4-10

PATTERNS OF PROGRESS FOR SEDL CHILDREN

	Head Start*	No Preschool*	Some Preschool*	Overall*
Reading				
Total Math				
Math Computations				
Math Concepts				

* Substantial differences between FT and NFT background characteristics.

Overall, the SEDL program appears to benefit children in math computations and appears to be about as effective as the comparison group experience in reading. The comparison group experience does, however, produce larger gains for many children on math concepts. The fact that the SEDL program appears to produce as much progress in reading and in most math areas as is realized in the comparison group, is a very favorable finding. The majority of children served are bilingual, economically disadvantaged and had low scores at entry to school, thus progress by these children which is as large or larger than the comparison groups who are predominantly English speaking and otherwise advantaged, is a notable finding.

CALIFORNIA PROCESS MODEL

Description of the Model

The California Process Model is designed to supplement rather than modify existing elementary school programs in local communities: each individual community develops its own educational strategy, with the assistance of the California State Department of Education. As a general philosophy, the programs in the various communities adapt to the local needs of different cultural groups. Essentially a diagnostic/prescriptive instructional approach, the California Process programs also include strong emphasis on the home-school-community partnership as necessary to the intellectual, social, and physical development of the child.

Local development teams--composed of parents, teachers, paraprofessionals, administrators, sponsor representatives, and representatives of other segments of the community--develop the objectives, methodologies, and materials to be used in their school district. These teams first analyze the needs of the children in their community, using standardized tests or adapting diagnostic tools to suit more adequately the local population. The teams next identify learning and behavioral objectives and finally prescribe appropriate field-developed curriculum materials for individualized study. The goal of the California Process programs is that the Follow Through children achieve the normal range and distribution of scores on standardized tests by the completion of third grade.

Characteristics of the Children

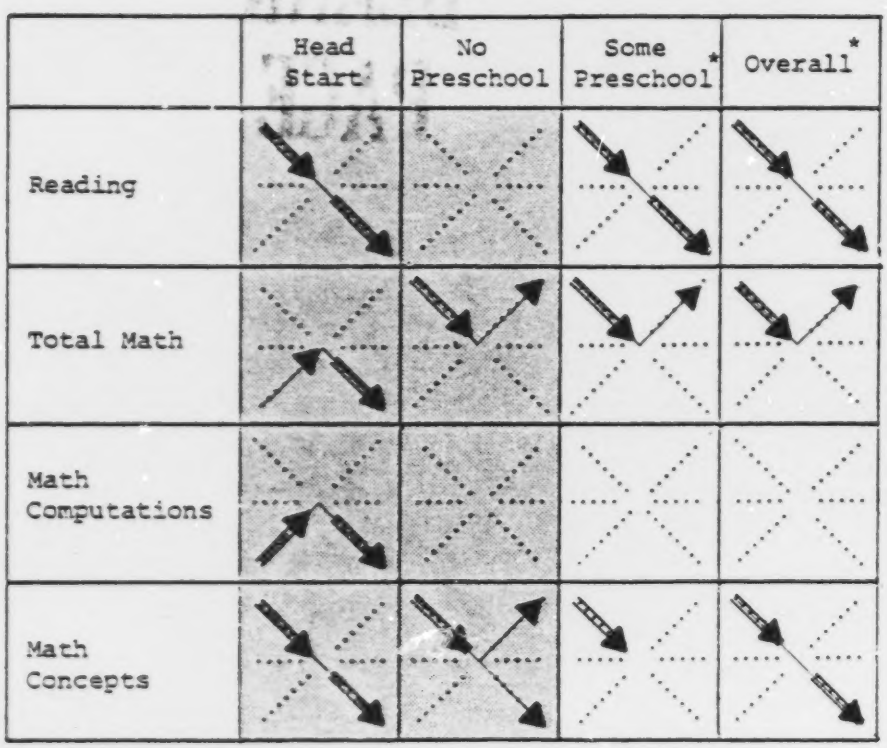
Only the CAL Process SPS group contain a sufficient number of children for separate analysis and discussion (see Appendix Table I4-31). All of the children in this group are either Black or Spanish surnamed. Their median income is $2,000 below the NFT SPS group and the group in general appears to be very different from the NFT SPS children. Although the CAL Process HS and NPS groups are small in size, the characteristics as reflected in the overall sponsor's means are of interest (see Appendix Table D4-31). The children in the CAL Process group are predominantly Black or Spanish surnamed, their median income is quite low, $4,250. Their WRAT mean (36.5) is, however, unusually high. Overall, as well as within preschool category, the CAL Process and NFT children do not appear to be comparable. Thus, the comparison of the progress of the CAL Process and comparison children must be interpreted with caution.

Findings

The patterns of gains for the children in the CAL Process program are different from comparison children (see Figure 4-11 and Appendix Table I4-32). In general, the program does not appear to be as effective as the comparison group experience at producing gains in reading and math concepts. However, a substantial percentage of the children (33 percent) do gain more than comparison children on total math during second and third grades. On math computations, the gains for the children with some preschool and overall are not different from the comparison children. Given the limited sample and disparate characteristics of the CAL Process versus comparison group, the findings are of limited use for generalization.

Figure 4-11

PATTERNS OF PROGRESS FOR CAL PROCESS CHILDREN



* Substantial differences between FT and NFT background characteristics.

CHAPTER FIVE

AN OVERVIEW OF THE FINDINGS AND CONCLUSIONS

The longitudinal study of the timing of program impacts in various achievement areas for children with various preschool experience presents a complex array of results. In this chapter we attempt to arrive at a more general understanding of the impact of Follow Through models over time. The chapter begins with a comparative perspective on the findings, turns to a longitudinal perspective and finally reviews the objectives of the evaluation and proffers some recommendations in the light of several recurrent caveats.

A Comparative Perspective

A question to which the Follow Through evaluation should provide a distinct answer concerns the comparative effects of programs, that is: Are some Follow Through programs better than others at producing gains in reading and math achievement? The scope of this question must be better specified before it can be answered. Clearly, several of the models should not be included in a comparative study of effects, since they deal with children who are substantially different from those in the comparison group and other programs* Included in this group are: SEDL, which deals with predominantly bilingual and/or Spanish-surnamed children;

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* Other studies in the evaluation follow different analytic procedures and deal with different samples of children and may not be subject to these constraints.

CAL Process, which serves a very small number of children who are atypical in that they are quite poor but have exceptionally high scores on the WRAT at entry to school; and IELP, which servs the most advantaged children in the analysis.

The comparison of SEDL to the other FT programs is inappropriate since this program is unique among the FT programs in that it was designed to serve bilingual and/or Spanish-surnamed children. The effects that the SEDL program has had would not be expected to occur with other groups, e.g., other types of minority children, nor would other programs not designed to deal with bilingual children be expected to produce effects similar to those of the SEDL program. Ideally, the progress of the SEDL children should be compared to the progress of similar children involved in other programs designed to serve bilingual children or to the progress of similar children in traditional classrooms.*

The CAL process group, as noted, is quite small and also atypical with respect to background characteristics. Whether the generally unfavorable findings for this program can be attributed to the program or to other unknown factors is impossible to determine. However, that the children included for analysis are substantially different from other FT models' groups is sufficient reason to exclude the sponsor from comparative study. Finally, the IELP group is also atypical and quite small in size. Although IELP appears to produce many favorable effects, it is unclear whether they are caused by the program or result from the relatively poor match between the advantaged IELP children and the comparison children. Other programs might produce effects similar to the IELP given similarly advantaged children.

The scope of model comparisons could be reduced further by considering the diverse program goals. Not all programs place equal emphasis on achievement during the early elementary years. Therefore, it may be argued that the programs should be assessed only with measures appropriate to their goals. In the authors' opinion, such a perspective entails

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* Approximately 10% of the NFT children are bilingual and/or have Spanish surnames; thus, a limited study of this nature would be possible with existing data. Comparison of FT versus NFT children within site as in other FT studies is also likely to yield fairer comparison since local site FT and NFT groups often have similar ethnic and language characteristics.

a premature conclusion. The achievement findings may be taken as one important aspect of social competence and the program which produces achievement gains acknowledged for this accomplishment. However, we must also recognize that the desirability or educational importance of achievement tests or gains is not totally agreed upon. This issue of the meaning of achievement tests is not within the scope of the Follow Through evaluation. Such a question can only be answered by the informed judgement of educational researchers, teachers, and parents, and by further research designed to assess the relationship between a child's life chances and scores on academic achievement tests. Irrespective of the author's or the reader's personal biases, we simply do not have a consensus on this issue and must allow the several opinions on the meaning and importance of achievement measures to stand pending future research.

Let us now turn to a comparison of the effects of the remaining programs. In Table 5-1, the ratio of the number of favorable program effects to the number of effects assessed is presented for each of the models. Two ratios are presented; one for the comparisons which indicate progress by FT children which is larger than progress by comparison children, and a second ratio for the comparisons which indicate progress by FT children which is as large or larger than the comparison children's progress.* This simple metric clearly shows that many children in the Direct Instruction and Behavior Analysis programs achieve larger gains than comparison children relatively more often than the other programs. Both of these programs are often exceptionally successful at producing achievement gains and both programs also place a major emphasis on academic achievement.

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* The number of effects assessed for a given sponsor included the early and late interval for each outcome measure for each non-shaded preschool group. Tables 4-1 to 4-8 provide the data for these counts. If a preschool group was shaded and the overall pattern was not shaded, the effects assessed in the overall pattern were counted. For the count of progress by FT children which was larger than NFT, only upward arrows were counted. For the count of progress by FT children which was equal or better than NFT upward arrows, horizontal arrows and the absence of a pattern were counted. When a group displayed two patterns for a given measure and interval, the interval was counted once and any favorable pattern was counted.

TABLE 5-1

RATIO OF THE NUMBER OF FT/NFT COMPARISON
WHICH FAVOR A PROGRAM TO THE
NUMBER OF COMPARISONS

	PROGRESS	
	FT > NFT	FT ≥ NFT
Responsive Education	1/20	13/20
TEEM	0/24	19/24
Bank Street	3/16	11/16
Direct Instruction	15/22	21/22
Behavioral Analysis	13/24	17/24
Cognitive Curriculum	4/16	7/16
Parent Education	2/24	17/24
EDC	9/24	11/24

FT > NFT: Many FT children progressed more than most NFT children.

FT ≥ NFT: FT children showed progress which was greater than or equal to NFT.

The second ratio which indicates the cases where FT children's progress is equal to or greater than NFT children's progress, is useful for characterizing the remaining FT programs. The ratios indicate that FT children in the Responsive Education, TEEM, Bank Street, and Parent Education programs progress as much or more than comparison children in about three out of four comparisons, while the children in the Cognitive Curriculum and EDC programs progress as much or more than NFT children in only half of the cases. Thus, the Direct Instruction and Behavior Analysis programs appear to be better at producing progress on achievement measures than NFT. The Responsive Education, TEEM, Bank Street and Parent Education programs appear to be about equal to NFT in their ability to produce achievement gains and the remaining programs. Cognitive Curriculum and EDC appear to produce less progress on these measures than does NFT.

Our next question concerns the areas of achievement. In what achievement areas do the impacts occur for the different programs? Table 5-2 shows the program impacts by outcome category using the same set of ratios as Table 5-1. The table indicates that the Direct Instruction program is the only program that consistently produces larger gains for FT children in reading. The Bank Street, Behavior Analysis and Parent Education programs rank second and appeared to be able to move their children along in reading at more or less the same rate as NFT children. The remaining models fare much worse in reading achievement. None of the remaining programs produce notably large gains; moreover, they are able to keep their children gaining at the same rate as NFT children in fewer than 1 in 4 comparisons. The math picture is quite different. Virtually all of the programs appear to be able to produce math gains equal to those in NFT. Again, only the Direct Instruction and Behavioral Analyses programs produce gains greater than NFT in more cases than not, and even these programs do not appear to be outstanding on math concepts. The EDC program is also notable on math achievement, showing larger gains than NFT in half of the comparisons. The disparity between the frequency of favorable impacts in math as opposed to reading suggests that reading and reading achievement may be, in general, less tractable or teachable than the quantitative area.

TABLE 5-2

RATIO OF FAVORABLE PROGRAM EFFECTS

TO IMPACTS ASSESSED BY OUTCOME MEASURES

MODEL	READING		TOTAL MATH		MATH COMPUTE		MATH CONCEPTS	
	FT > NFT	FT ≥ NFT	FT > NFT	FT ≥ NFT	FT > NFT	FT ≥ NFT	FT > NFT	FT ≥ NFT
Resp. Ed.	0/6	1/6	0/4	3/4	1/4	3/4	0/6	6/6
TEEM	0/6	1/6	0/6	6/6	0/6	6/6	0/6	6/6
Bank Street	0/4	3/4	1/4	3/4	1/4	3/4	1/4	3/4
Direct Instruc.	3/4	3/4	5/6	6/6	5/6	6/6	2/6	6/6
Behavior Analysis	2/6	4/6	4/6	4/6	4/6	5/6	3/6	4/6
Cog. Curr.	0/4	1/4	1/4	2/4	2/4	2/4	1/4	2/4
Parent Ed.	0/6	3/6	1/6	5/6	1/6	5/6	0/6	4/6
EDC	0/6	1/6	3/6	3/6	3/6	4/6	3/6	3/6

FT > NFT: FT children progressed more than NFT children.

FT ≥ NFT: FT children showed progress which was greater than or equal to NFT.

Let us now explore the timing question: When during the course of their early school years do the children show achievement gains in the different programs? The differences among program results vary from one outcome measure to another. The schematic characterization of the longitudinal patterns, the star graphs*, provides a useful device for dealing with the data at this disaggregated level. These patterns are organized by outcome measure in Figure 5-1 to 5-4. These figures indicate that there is substantial variation in the timing of program impacts. In reading, only the children in Direct Instruction and Behavior Analysis programs progress more than comparison children with any consistency, and many children in each of these programs show a pattern of substantial early progress followed by less progress later. Thus, gains in reading achievement not only appear to be difficult overall but also appear to get progressively more difficult in later grades, presenting a challenge even to programs with an academic emphasis.

The findings for math suggest that this area also becomes more difficult in later grades. This increase in difficulty is suggested by the relatively small number of cases in which FT children progress more than NFT children during second and third grades and the relatively large number of cases in which the FT children progress less than NFT during this period. Of the 43 comparisons which indicate that FT children progressed more than NFT on math measures, 29 occurred during kindergarten and first grades, and only 14 occurred during second and third grades. Furthermore, of the 27 comparisons in which the FT children progressed less than NFT children on math measures, 23 occurred during second and third grades.

Most of the Follow Through programs share in the early gains in math. The Behavior Analysis and EDC programs, however, are consistently successful early. Notable progress during second and third grades appears to be more difficult to achieve. The Direct Instruction Model stands out as the only program for which many of the children progress more than comparison children during second and third grades in math achievement. The Cognitive Curriculum children also progress more than

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* See Chapter Three for an explanation of these charts.

NFT children but the impact of the program is more modest. If one assumes that the progress of the children during the second and third grades is the best indicator of what will happen during subsequent school years, then the prognosis for future achievement for these children is perhaps better than for children in other programs.*

These two programs, the Direct Instruction Model and the Cognitive Curriculum program, span the range of variation of educational emphasis represented by the various FT programs. That both of these programs share in what may be the most important finding in the FT evaluation, favorable progress late in the program which may carry over into later years, highlights the importance of gaining a deeper understanding of the models. Clearly, there are <u>different paths</u> to progress on achievement, at least in math.

It is perhaps worth discussing <u>why</u> the impacts of the FT programs occur more frequently during the kindergarten and first grade periods. Thus far, the inferences that reading is more difficult to teach than math, and that both skills become progressively more difficult in later grades have been presented. Rather than the increased difficulty of the subject area, the degree of program implementation may account for this finding.

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* Lest the methodologically oriented reader dismiss the progress of these groups as an artifact, particularly that of the Cognitive Curriculum children who gained relatively less in math than most children early and then relatively more later, the reader is invited to explore the status of the children in these sponsors' groups across time using raw scores or T scores. The sponsors' data are presented in Tables D4-12 for the Direct Instruction group, and D4-18 for the Cognitive Curriculum group. These tables indicate that in math the Direct Instruction children move ahead of NFT children not only in terms of relative progress (average residuals) but also catch up to or exceed the comparison children in absolute scores (T-scores). The picture for the children in the Cognitive Curriculum is not as clear. Their progress manifests only a partial closing of the gap between their scores and the scores of NFT children. That is, their T-scores in math range from approximately 40 to 43 at the end of first grade vs 43 to 47 at the end of the third grade, where the NFT mean is 50. The pattern of progress indicates that although many of these children progressed less than comparison children during kindergarten and first grade, they reverse the pattern during second and third grade and progress more than NFT children.

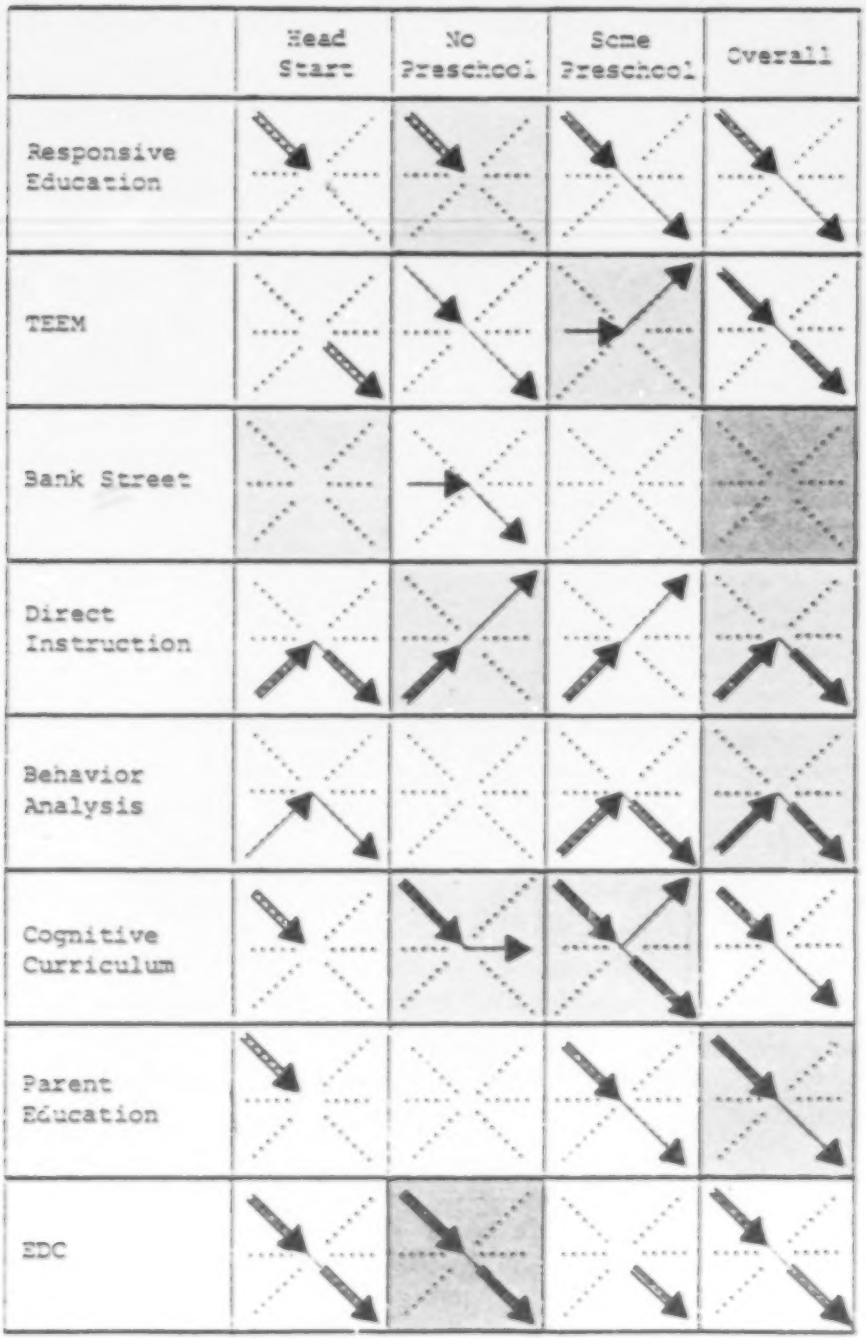
Many of the Follow Through elementary school programs were developed from preexisting preschool models and were progressively extended into the early elementary school years as Follow Through expanded. The program for preschool children and perhaps for kindergarten and first grade children may have been more refined and better conceptualized due to the previous experience of many sponsors. Teacher training and implementation for the early years may also have been more effective than for the later years which required further development. This improvement in the implementation and conceptualization of programs with experience is also suggested by the improvement in the sponsor effects in later cohorts (see Volume IV-A). Thus, the presence of more favorable impacts, early rather than late, may relate to differences in implementation across grades.

Let us now turn to the preschool question: Do the programs show different impacts for children with different preschool experiences? Our ability to assess the comparative impacts of programs on children with different preschool experience is severely limited by the fact that 7 of the 24 preschool groups contain fewer than 30 children. Furthermore, the comparison of the progress of FT children with Head Start vs. FT children with no preschool is possible only for three sponsors: TEEM, Behavior Analysis and Parent Education. The TEEM children with Head Start and with no preschool experience have very similar patterns of progress. These groups both gain somewhat less in reading than comparison children but show no difference on progress in math. In the Behavior Analysis program, the Head Start graduates and children with no preschool both show early progress which is greater than that of NFT children. However, many Head Start graduates progress less than NFT children in all areas except math computations during second and third grades, whereas the children with no preschool show progress which is equal to or greater than NFT children. Thus, the Behavior Analysis program appears to be somewhat more beneficial for children with no preschool experience than for Head Start graduates.

The effects of the Parent Education program do not appear to be related to the preschool experience of the child or to the particular achievement outcomes. Since this program does "not enunciate specific achievement goals for children, nor does it recommend a particular

Figure 5-1

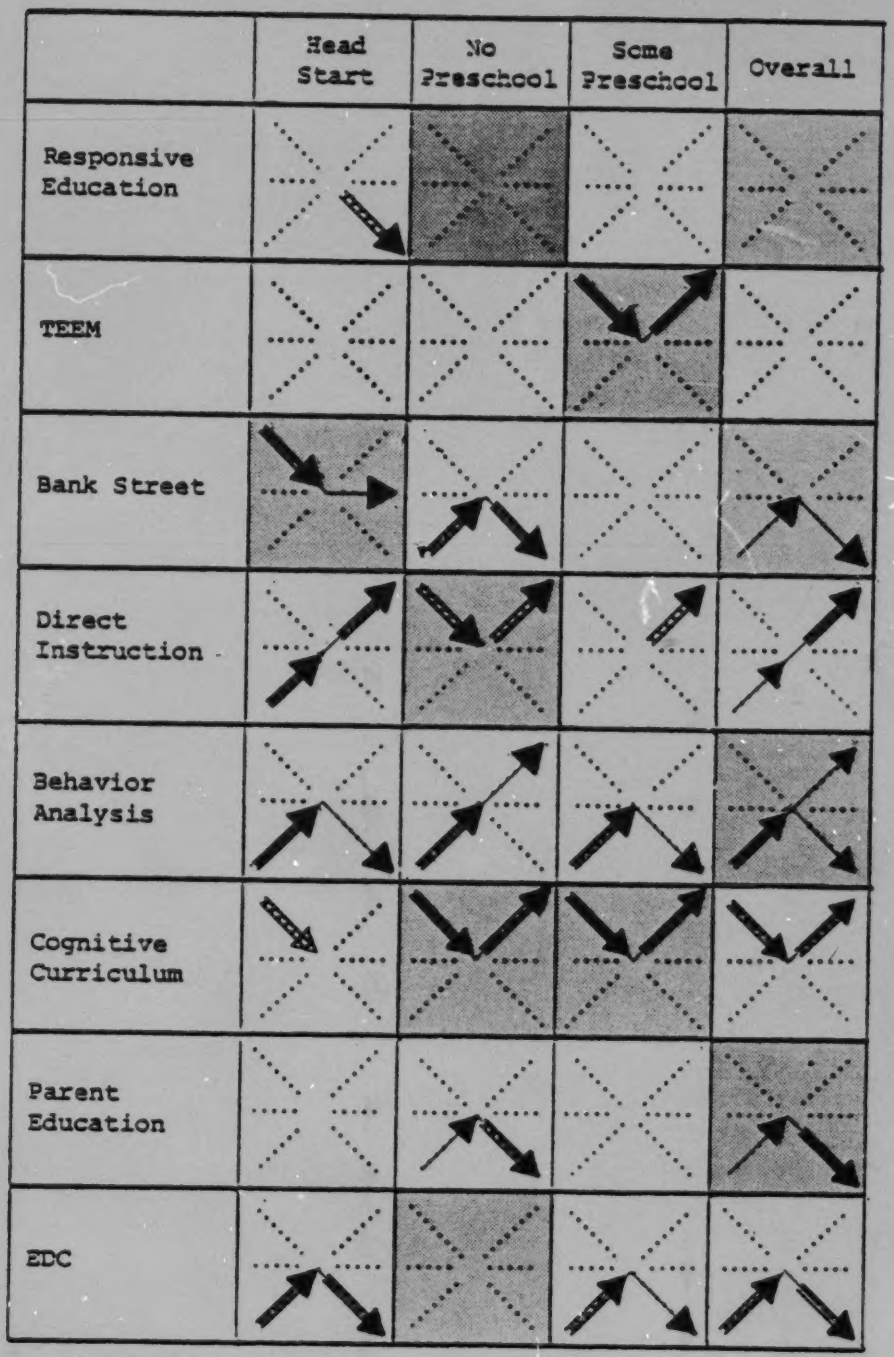
LONGITUDINAL PATTERNS FOR FT MODELS IN READING



NOTE -- Shading indicates preschool groups with fewer than 30 children or, in overall cell, impacts which vary for preschool groups.

Figure 5-2

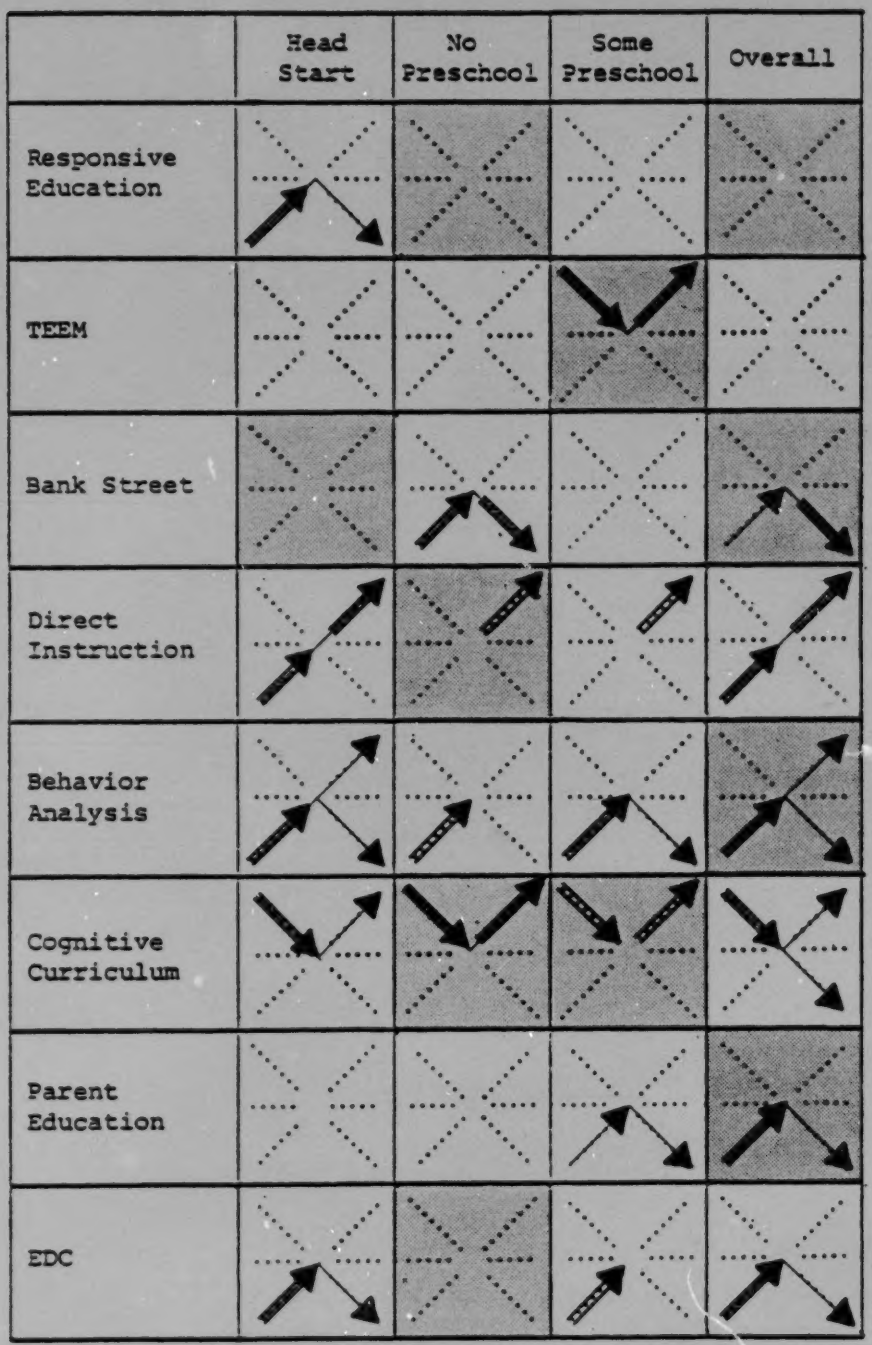
LONGITUDINAL PATTERNS FOR FT MODELS IN TOTAL MATH



NOTE -- Shading indicates preschool groups with fewer than 30 children or, in overall cell, impacts which vary for preschool groups.

Figure 5-3

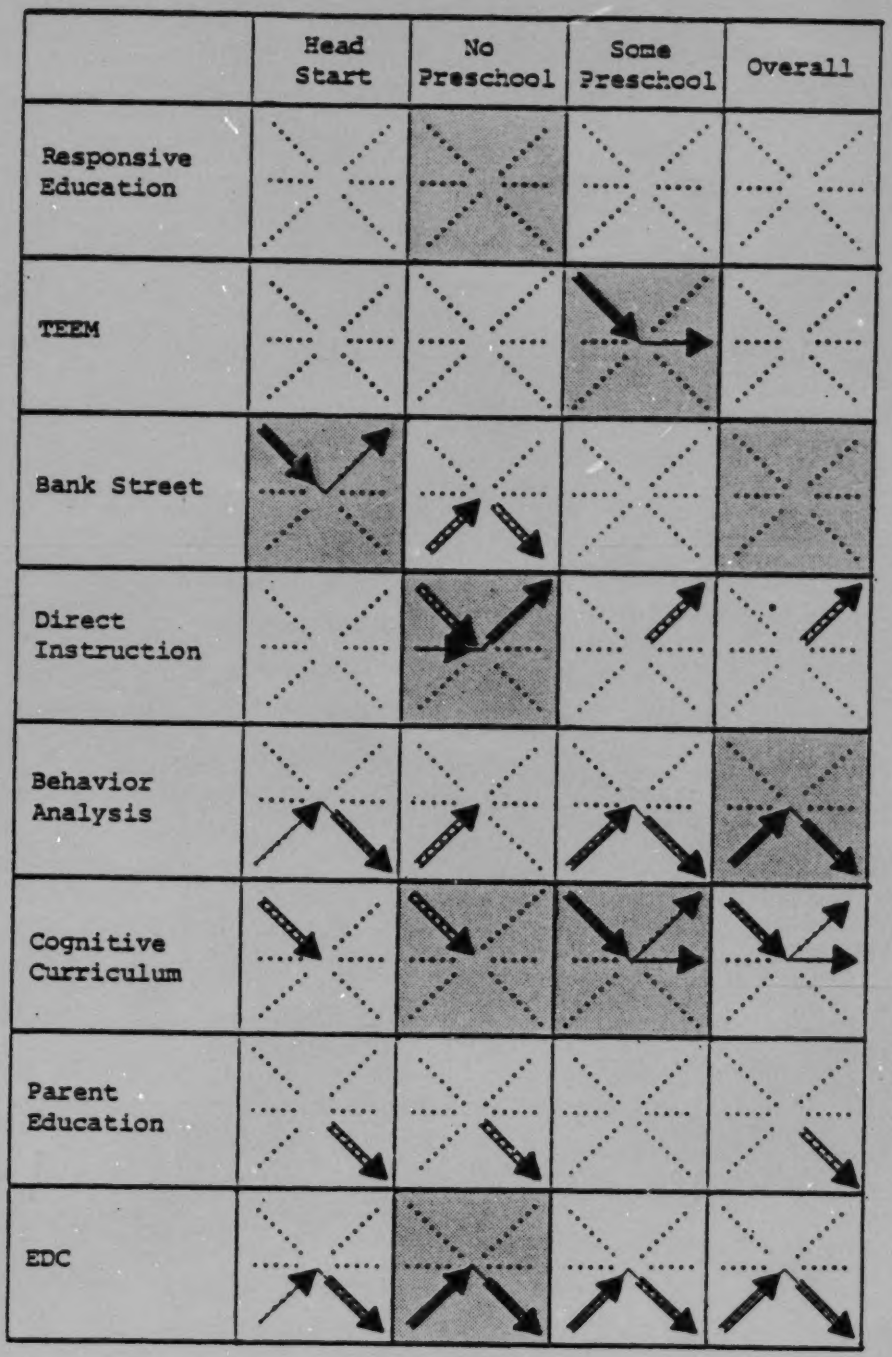
LONGITUDINAL PATTERNS FOR FT MODELS IN COMPUTATIONS



NOTE -- Shading indicates preschool groups with fewer than 30 children or, in overall cell, impacts which vary for preschool groups.

Figure 5-4

LONGITUDINAL PATTERNS FOR FT MODELS IN CONCEPTS



NOTE -- Shading indicates preschool groups with fewer than 30 children or, in overall cell, impacts which vary for preschool groups.

classroom curriculum or teaching strategy",* the heterogeneous findings are to be expected. Program emphasis is likely to vary across sites, teachers, and even parent educators. Thus the difference in impacts may actually manifest unspecified variations in program emphasis.

As a final note, the similarity of the longitudinal patterns across models and outcome measures for Head Start graduates and for children in the some preschool group should be mentioned. These two groups can be compared for five of the models, and in nearly all cases the patterns of gains for the two groups are identical.

In summary then, all FT models appear capable of producing progress in math, especially math computations early in the program. In the verbal area, progress is more difficult to achieve for all models, particularly during the late period; however, when notable progress is produced, the models with a direct academic emphasis tend to produce the progress. Few differences in the patterns of progress are found for children with different preschool experience.

A Longitudinal Perspective

Let us now turn to another perspective. An essential part of the motivation for Project Follow Through was to extend the educational support of the preschool child into early years of elementary school. Many studies in early education had suggested that in the absence of such sustained support, the relative benefits to school readiness derived from preschool programs were soon lost in elementary school as children without those benefits quickly caught up with their Head Start peers. This type of finding can be expressed as a longitudinal pattern of early gain (relative to a comparison group) followed by later loss (relative to the comparison group).

The purpose of this section is to examine the longitudinal patterns to determine the extent to which such a pattern may have persisted, or some other longitudinal pattern may have obtained under the conditions of the Follow Through programs. From the perspective of previous research in early education, we can characterize a number of longitudinal patterns

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* See model description.

which suggest either a salutary impact of elementary schooling, or the "expected" pattern of early gain followed by later relative loss.

Drawing upon the summary of sponsor effects appearing in Figures 5-1 to 5-4, we have outlined four especially important longitudinal profiles in Table 5-3 according to the following interpretations:

- Early gain -- This pattern characterizes those programs which demonstrated gains greater than non-Follow Through during the early period, and did not demonstrate a relative loss later. That is, during the late period they demonstrated either no change or further gains compared to non-Follow Through.

- Delayed gain -- This profile characterizes those programs which failed to demonstrate gains during the early period, i.e., either the same gain or less gain than non-Follow Through, and during the later period showed greater gains than the comparison group.

- Delayed loss -- This pattern characterizes those programs which, during the early period, succeeded in either maintaining their status relative to the comparison group or even gaining more, but during the later period demonstrated the relative loss characteristic of many earlier studies.

- Early loss -- Programs demonstrating this profile are those which failed even to maintain their relative status with the comparison group during the early period, and during the later period did not improve, i.e., they either gained the same as or less than their non-Follow Through comparison groups.

This series of longitudinal patterns is ordered within the table from the most desirable to the least beneficial within the context of expectations from previous research. Clearly early gain is the most desirable pattern; however, delayed gain also suggests a positive impact of programs, although timed somewhat differently. Even the delayed loss pattern may suggest positive program impacts relative to the "expected" longitudinal pattern; however, these effects are early and do not persist into the later period. The early loss pattern is demonstrated by programs which obtain the "expected" characteristic of the failure of elementary schooling to sustain or build upon the potential benefits of the preschool years.

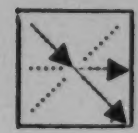
The results in Table 5-3 reflect the distinction between the specific quantitative area of computations and the verbal areas of reading and math concepts. We discuss the patterns with respect only to these distinctions to focus more clearly on content area differences. Note that in the math computations area none of the models appear in the right most cell of early loss. About half of the models registering effects in math computations appear in the early gain or delayed gain cells, while the other half appear in the delayed loss category. This tendency for more persistent or sustained effects in computation suggests once again, that the skills involved are more "teachable" than the verbal. This favorable pattern of early gain is produced by several types of models, and overall there appears to be no detectable tendency for any one sponsor type to produce a given pattern for any particular preschool group in the quantitative area.

In the more verbal area including both reading and math concepts the picture is somewhat different. If we consider the more favorable patterns, the early gain or delayed gain types, only the academic emphasis models appear. In the early loss category many models are found but neither academic emphasis model is among them. In the delayed loss category 13 groups are found, and these include the direct academic focus as well as the other programs. Thus, it seems that most types of sponsors are able to produce at least early verbal effects, but the academic emphasis models produce sustained effects on verbal academic achievement tests.

One other tendency appears noteworthy in the longitudinal patterns for the verbal area. In the early and delayed gain profiles, there are no cases of positive models impact for the Head Start category of children, while in the delayed and early loss profiles, there is a tendency for the Head Start cell to be more populated by model effects than the other two cells. Thus, as noted above, for the Follow Through population the verbal area appears to be more difficult. Furthermore, within that population, the lowest-income group of children, i.e., the Head Start group, present the most difficult challenge for the Follow Through programs.

Table 5-3

SPONSOR GROUPS WITH DIFFERENT TYPES OF LONGITUDINAL PATTERNS

	Early Gain (No Loss)			Delayed Gain			Delayed Loss			 Early Loss (No Gain)		
	Head Start	No Preschool	Some Preschool	Head Start	No Preschool	Some Preschool	Head Start	No Preschool	Some Preschool	Head Start	No Preschool	Some Preschool
Math Computations	Direct Instruction (Behavior Analysis*)	Behavior Analysis	Direct Instruction EDC	Cognitive Curriculum		TEEM Direct Instruction	EDC Responsive Education (Behavior Analysis*)	Bank Street	Behavior Analysis Parent Education			
Reading			Direct Instruction				TEEM Behavior Analysis Direct Instruction	Bank Street	EDC Behavior Analysis	Responsive Education Cognitive Curriculum Parent Education EDL	Responsive Education	Responsive Education Parent Education
Math Concepts		Behavior Analysis				Direct Instruction	EDC Behavior Analysis Cognitive Curriculum		EDC Behavior Analysis			

*Parenthese indicate a group which displayed multiple patterns.

Implications of the Longitudinal Study

The objective of the longitudinal study was to determine the extent to which specific sponsors or types of educational models were effective in different outcome areas for children with different types of preschool experience at different periods of time. The foregoing summary of the results suggests a limited answer to this inquiry, and it is important for policy purposes to consider the reasons for the limitations. In so doing we are led back to the caveats discussed in the design limitations of Chapter Two and the Analysis Strategy of Chapter Three. Our purpose here, however, is not simply to leave the reader with yet another precautionary note, but to offer suggestions on how to cope productively with these problems in future policy-related studies.

Measurement. The results suggest, in general, that programs which invest in more direct academic teaching procedures produce more direct results in academic skills. If such a direct relationship between instructional focus and instructional results obtains in most models, then one may hypothesize that the Follow Through programs may be producing effects which remain yet to be evaluated. That is, the majority of the Follow Through programs emphasize such nontraditional areas as productive language skills, problem-solving, systematic exploration of new and unfamiliar situations, self-concept, identity relative to cultural and personal strengths, and feelings of efficacy toward and persistence in learning new material. The absence of measures of these nontraditional areas which are seen by program advocates as requisite to future learning and adaptive social functioning is an unfortunate state of affairs.

Although measures of problem-solving, self-esteem, and locus of control were included in the third grade posttest battery, these areas were not assessed in a manner appropriate for longitudinal study. Furthermore, in the absence of genuinely appropriate pretest measures or intermediate measures, the analytic models for these measures tend to be very weak when compared with models for achievement measures (see Chapter Four, Volume IV-A). Although a number of factors contributed to this problem, we cannot at this time draw conclusions concerning the longitudinal impact of many of the Follow Through sponsors on their stated primary objectives.

The results also suggest that a variety of models which do not appear to have an academic emphasis produce favorable progress in quantitative skills, particularly during the early period. In light of this finding, we must examine in more detail the areas which these sponsors emphasize more directly. This examination may indicate that specific academic skills can be derived from approaches other than direct academic instruction. Without the analysis of the approaches, we cannot establish the causal sequence which has led up to the findings. As the sponsor descriptions indicate, most of the FT programs do not utilize traditional formats in their curriculum, they do not "teach to the test" and their children have little experience with testing situations and less experience with standardized achievement tests. In light of this emphasis, the existence of achievement gains lead one to ask the question: If these programs are not focusing specifically on reading and math achievement, what are they teaching and how do they maintain their status relative to programs which presumably do teach these traditional areas more directly? Unfortunately, we cannot answer this question with the measures available.

Specifying the treatment. The usefulness of an evaluation such as that of Follow Through is not only to assess the historical results derived from the expenditure of national resources, but also to provide information to guide future educational programs. The longitudinal study provides at least a partial answer to the former issue. However, if the study is to provide guidelines for implementing future programs we must have a clear understanding of the active ingredients producing the effects observed in the analysis, that is, the causal agents. The results of this study suggest that degree of academic focus in the curriculum corresponds roughly with the degree of impact on academic achievement tests; however, the academic-emphasis programs differ to some extent in their approach and in their results. Positive impacts are also observed under certain conditions with certain sponsors which have a developmental or psychodynamic or even a non-specified curricular approach.

One implication of these results is that the continuation of programs already in place may produce results similar to those observed in

this study. However, we cannot be certain that such results would be obtained in other sites under other circumstances with other groups of children. By far the greatest amount of variance in the analytic models of the Follow Through variation is attributable to demographic and background conditions, and most often the variance attributable to site differences exceeds that attributable to treatment differences (see Chapter Four, Volume IV-A). Since treatments are characterized only nominally by membership, it is unclear whether the active program ingredients are sponsors' curriculum materials, supportive administrators, teachers, parents, children or any of a variety of these or other factors. Clearly, a much more fine-grained description of the classroom materials, organization and processes as well as their interaction with child differences would account for more variance and help explain the outcomes. By extension, the manipulation of these factors in future program implementations would also account for observed changes in program impact. The current results suggest that dissemination of Follow Through programs requires Follow Through sponsors, and that the active ingredients of sponsor programs, whether they are the materials, the training of staff, the classroom organization, the sponsor impact on parents, or other factors not under the sponsor's control remain yet to be identified.

Comparison groups. The results of this study are, of course, produced by the contrast of a Follow Through group with a non-Follow Through group. While this design rubric served very well and continues to be useful in laboratory studies, its translation into a study of educational reform in real-world circumstances throughout the country suffers from two serious flaws of design logic: groups were not assigned randomly to treatment and control conditions; and the "control" condition in fact involves some unspecified treatment of its own. Given the extensive airing of these issues in the past, there is no need to review them at length here. At the same time, their historical redundancy in evaluation research does not provide grounds for ignoring them at the conclusion of this study.

The summary of the results above suggests that when programs had difficulty demonstrating positive effects, it was the Head Start group which tended to show relatively less gain than their non-Follow

Through peers. One could conclude that Head Start children, as the economically poorest group in the sample, presented the greatest obstacles for sponsors to overcome. On the other hand, the match between the Follow Through and non-Follow Through Head Start groups was closer than was true of other matches. However, as noted in Chapter Two, this subgroup of the school population, Head Start graduates, is more likely to receive some form of compensatory educational benefit whether from Follow Through, Title I or any of a variety of other forms of compensatory education. Under these circumstances, the comparison of FT to NFT has a lower likelihood of demonstrating favorable program impacts because of the presence of an unspecified educational treatment in the "control" condition. The current study lacks information on this issue.

Just as implementation studies are needed to determine the active ingredients of the treatment programs, so also are similar data needed to assess the relevance of the "non-treatment" condition in naturalistic studies of this kind. Ultimately, the problems associated with non-comparable treatment and comparison groups may be surmounted by achieving a detailed description of the learning environment, the children, and the interactions between the two, that is, by a causal account of the relations between a program and children's learning. The distinctions between "experimental" and "control" groups would thus depend upon the specificity of the active ingredients rather than upon the random or coincidental differences between groups.

SUMMARY

Subject to the limitations discussed above, the results of the longitudinal study suggest the following:

- Follow Through programs have been relatively more effective in the quantitative area than in the verbal area on group academic achievement tests, particularly during the first two years of elementary school.
- A variety of educational models are capable of producing notable progress in the early period in the quantitative areas. In the verbal area, most positive effects on academic achievement tests derive from programs with a direct academic emphasis, and where these effects persist, they do so longer in this type of program.

- The tendency to gain relatively less over the first two years appears more frequently for Head Start groups than other preschool groups.
- Proliferation of innovative educational models should be accompanied by corresponding non-traditional measures and research designs aimed at capturing more fully the range of educationally active ingredients.

Appendix Table I2-1

DISTRIBUTION OF COMPARISON CHILDREN IN THE LONGITUDINAL SAMPLE BY PRESCHOOL EXPERIENCE AND SITE

Site	Head Start	No Preschool	Some Preschool
New York, NY	9	23	10
Philadelphia, PA	6	113	42
Los Angeles, CA	12	12	3
Buffalo, NY	1	1	7
Duluth, MN	4	22	5
Fresno, CA	0	8	10
St. Louis, MO	9	0	2
Salt Lake City, UT	3	12	7
Tacoma, WA	1	7	1
Chicasha, OK	3	18	5
Des Moines, IA	1	6	7
Lakewood, NJ	3	9	10
Newark, NJ	8	7	1
Lincoln, NB	2	28	12
Wichita, KS	3	5	11
Brattleboro, VT	0	11	2
Fall River, MA	3	21	1
New Haven, CT	4	1	1
Grand Rapids, MI	3	14	5
W. Iron Co., MI	2	6	13
Flint, MI	0	13	4
Providence, RI	3	8	11
Portagevills, MO	8	9	3
Trenton, NJ	1	12	5
Kansas City, MO	3	3	1
Louisville, KY	21	25	4
Waukegan, IL	0	25	2
Okaloosa Co., FL	1	17	4
Greeley, CO	6	1	2
Seattle, WA	4	2	7

Appendix Table I2-1 (cont.)

Site	Head Start	No Preschool	Some Preschool
Richmond, VA	2	6	2
Yakima, WA	0	9	1
Houston, TX	0	6	2
Lawrenceburg, IN	1	14	8
Burlington, VT	1	10	7
Lackawanna Co., PA	0	23	7
Morgan Comm. Sch., DC	1	0	2
Paterson, NJ	0	4	6
Chicago, IL	1	9	4
Lock Haven, PA	0	23	7
Montevideo, MN	24	38	19
Tulare, CA	1	22	16
St. Martin Parish, LA	16	15	1
San Diego, TX	0	22	1
Ravenswood, CA	3	0	2
Oakland, CA	0	0	2
San Jose, CA	1	6	1
TOTAL	175	646	286

Appendix Table I2-2

DISTRIBUTION OF PROGRAM CHILDREN IN THE LONGITUDINAL SAMPLE
BY PRESCHOOL EXPERIENCE AND SITE

Sponsor	Site	Head Start	No Preschool	Some Preschool
RESPONSIVE EDUCATION	Buffalo, NY	9	4	18
	Duluth, MN	15	11	1
	Fresno, CA	3	2	14
	St. Louis, MO	12	1	2
	Salt Lake City, UT	10	1	4
	Tacoma, WA	13	4	1
	TOTAL	62	23	40
TEEM	Chicasha, OK	10	4	2
	Des Moines, IA	1	8	1
	Lakewood, NJ	29	1	1
	Newark, NJ	13	1	5
	Lincoln, NB	19	44	2
	Wichita, KS	19	7	3
	TOTAL	91	65	14
BANK STREET	New York, NY	4	4	8
	Philadelphia, PA	1	20	27
	Brattleboro, VT	2	3	3
	Fall River, MA	13	6	2
	New Haven, CT	5	1	5
	TOTAL	25	34	45

Appendix Table I2-2 (cont.)

Sponsor	Site	Head Start	No Preschool	Some Preschool
DIRECT INSTRUCTION	New York, NY	6	1	3
	Grand Rapids, MI	35	11	37
	W. Iron Co., MI	5	1	2
	Flint, MI	5	5	6
	Providence, RI	59	0	3
	TOTAL	110	18	51
BEHAVIOR ANLAYSIS	New York, NY	23	4	1
	Philadelphia, PA	15	32	40
	Portageville, MO	54	7	0
	Kansas City, MO	21	10	7
	Louisville, KY	40	16	4
	Waukegan, IL	10	16	5
	TOTAL	163	85	57
COGNITIVE CURRICULUM	New York, NY	8	4	8
	Okaloosa Co., FL	15	4	0
	Greeley, CO	9	2	3
	Seattle, WA	8	5	9
	Chicago, IL	19	0	0
	TOTAL	59	15	20
PARENT EDUCATION	Philadelphia, PA	0	12	21
	Richmond, VA	9	7	5
	Yakima, WA	12	10	3

Appendix Table I2-2 (cont.)

Sponsor	Site	Head Start	No Preschool	Some Preschool
PARENT EDUCATION (CONT.)	Houston, TX	20	11	11
	Lawrenceburg, IN	3	12	3
	TOTAL	44	52	43
EDC	Philadelphia, PA	9	6	46
	Burlington, VT	11	4	5
	Lackawanna Co., PA	6	15	6
	Morgan Comm. Sch., DC	11	1	3
	Paterson, NJ	0	0	5
	TOTAL	37	26	65
IELP	Lock Haven, PA	18	4	3
	Montevideo, MN	15	32	18
	TOTAL	33	36	21
SEDL	Philadelphia, PA	0	1	19
	Los Angeles, CA	15	14	36
	Tulare, CA	18	34	26
	St. Martin Parish, LA	48	14	1
	San Diego, TX	24	10	2
	TOTAL	105	73	84
CAL PROCESS	Los Angeles, CA	16	14	24
	Ravenswood, CA	7	2	9

Appendix Table I2-2 (cont.)

Sponsor	Site	Head Start	No Preschool	Some Preschool
CAL PROCESS (CONT.)	Oakland, CA	1	1	15
	San Jose, CA	0	4	10
	TOTAL	24	21	58

Appendix Table I2-3

DEFINITION AND DATA SOURCE FOR DESCRIPTIVE VARIABLES

Variable	Definition	Source
Entry Age in Months	Date of entry to school (assumed to be October 1, 1971) for all Cohort III-K children -- Date of birth.	School Record
Family Income	Expressed in $100 (truncated at $9,999 on interview)	Parent Interview
Number in Household	Includes all immediate family members plus others in household, e.g., uncle, etc.	Parent Interview
Highest Occupation in House	Coded variable with values: 11 = Laborer 12 = Service Workers 13 = Operatives 14 = Craftsman, Foreman 15 = Sales 16 = Clerical 17 = Propriators, Managers and Officials	Parent Interview
Mother's Education	Highest grade/level completed. Coded: 1 = No Schooling 2 = Kindergarten to Third Grade 3 = Fourth through Sixth Grade 4 = Seventh through Eighth Grade 5 = High School Incomplete 6 = High School Complete 7 = College Incomplete 8 = College Complete	Parent Interview
Children's Ethnicity	Percent White and Black self explanatory. Percent Spanish surnamed includes Mexican American, Cuban American, Puerto Rican American and other Latin Americans. These groups were too small for individual study.	Demographic Form
First Language	Child's primary language at entry to school. Coded as English or Other.	Demographic Form
Percent Bilingual	If child's first or second language was not English the child was classified as bilingual.	Demographic Form

Appendix Table I3-1

CODING OF VARIABLES FOR REGRESSION MODELS

Variable	Type	Code
Age at Entry to School	Quantitative	Months
Sex	Qualitative	Female = +.5 Male = -.5
Mother's Education	Quantitative	
Head of Household's Occupation	Quantitative	
Income	Quantitative	Hundreds of Dollars
Missing SES	Quantitative	0 = No SES data missing 1 = Mother's Education or Head of Household's Occupation or Income Missing 2 = Two SES sources missing 3 = All SES data missing
Ethnic Membership and Language (Note: The sample excluded Indians, Chinese and other ethnic groups.)	Pair of Qualitative	White vs. Black White = +1 Black = -1 Spanish Surnamed or Bilingual = 0 White vs. Spanish Surnamed or Bilingual White = +1 Black = 0 Spanish Surnamed or Bilingual = -1
WRAT	Quantitative	Raw Score
PSI	Quantitative	Raw Score

Appendix Table I3-2

REGRESSION MODELS FOR 1st GRADE READING
FOR NFT HEAD START, NO PRESCHOOL
AND OTHER PRESCHOOL CHILDREN

Variables Blocked In Order of Entry	Head Start			No Preschool			Other Preschool		
	b	S.E.	Beta	b	S.E.	Beta	b	S.E.	Beta
Age	.41*	.21	.11	- .30	.18	- .05	.25	.21	.05
Sex	-3.13	1.86	- .09	-2.18	1.50	- .04	- .51	1.62	- .01
Income	.11**	.04	.16	.05	.03	.05	.04	.03	.05
Occupation	- .06*	.57	- .00	.36	.47	.02	.64	.45	.08
Mother's Education	.77	1.02	.04	.98	.92	.04	-1.47	1.04	- .08
Missing SES	.62	.86	.03	- .16	.60	- .00	.36	.83	.02
White vs. Black	1.64*	1.54	.08	2.37	1.24	.09	- .71	1.46	- .03
White vs. Other	4.53	2.15	.15	2.29*	1.53	.07	6.59**	2.23	.22
Kindergarten Entry									
WRAT	.72**	.09	.49	.76**	.08	.42	.67**	.08	.46
PSI	.18	.22	.05	.26	.19	.06	.51*	.21	.14
MAT First Grade									
Reading									
Math									
Constant	-17.25	14.94		23.26	13.44		-7.39	14.45	

*indicates a regression coefficient which is significantly different from zero
(*$\rho \leq .05$; **$\rho \leq .01$)

Appendix Table I3-3

REGRESSION MODELS FOR 3rd GRADE READING
FOR NFT HEAD START, NO PRESCHOOL
AND OTHER PRESCHOOL CHILDREN

Variables Blocked In Order of Entry	Head Start			No Preschool			Other Preschool		
	b	S.E.	Beta	b	S.E.	Beta	b	S.E.	Beta
Age	- .30	.20	- .07	- .14	.12	- .03	.17	.17	.03
Sex	1.04	1.77	.02	-1.08	1.01	- .02	-1.36	1.32	- .03
Income	.00	.04	.00	.05*	.02	.06	.04	.03	.06
Occupation	.95	.54	.09	- .24	.31	- .02	.29	.37	.03
Mother's Education	.23	.97	.01	.13	.62	.00	.73	.85	.03
Missing SES	1.13	.80	.06	- .30	.40	- .02	- .74	.68	- .04
White vs. Black	.70	1.49	.03	1.75*	.83	.08	3.86*	1.19	.19
White vs. Other	.39	2.04	.01	1.72	1.03	.06	- .76	1.84	- .02
Kindergarten Entry									
WRAT	.06	.10	.03	.40**	.05	.26	.04	.07	.02
PSI	.01	.21	.00	.21	.13	.06	.71**	.17	.19
MAT First Grade									
Reading	.57**	.08	.51	.22**	.02	.26	.45**	.05	.43
Math	.41**	.11	.28	.31**	.05	.21	.15*	.07	.10
Constant				19.42	9.05		15.24	11.72	

*indicates a regression coefficient which is significantly different from zero
(*$\rho \leq .05$; **$\rho \leq .01$)

Appendix Table I3-4

REGRESSION MODELS FOR FIRST GRADE TOTAL MATH FOR
NFT HEAD START, NO PRESCHOOL AND OTHER PRESCHOOL CHILDREN

Variables Blocked In Order of Entry	Head Start			No Preschool			Other Preschool		
	b	S.E.	Beta	b	S.E.	Beta	b	S.E.	Beta
Age	0.29*	0.15	0.10	0.01	0.09	0.00	0.08	0.14	0.02
Sex	1.10	1.35	0.04	0.56	0.81	0.02	1.93	1.11	0.07
Income	0.03	0.03	0.06	0.04*	0.02	0.07	0.02	0.02	0.05
Occupation	0.68	0.41	0.10	0.28	0.25	0.03	1.11**	0.31	0.21
Mother's Education	-0.74	0.75	-0.05	0.29	0.50	0.02	-1.93**	0.71	-0.16
Missing SES	0.16	0.62	0.01	0.27	0.33	0.02	0.06	0.57	0.07
White vs. Black	3.68**	1.12	0.25	0.75	0.67	0.05	1.23	1.00	0.09
White vs. Other	0.46	1.57	0.02	-0.12	0.83	-0.00	1.64	1.53	0.08
Kindergarten Entry									
WRAT	0.46**	0.07	0.42	0.37**	0.04	0.36	0.39**	0.05	0.39
PSI	0.40*	0.16	0.17	0.57**	0.10	0.24	0.46**	0.14	0.19
MAT First Grade									
Reading									
Math									
Constant	-16.43	10.90		3.55	7.31		-0.49	9.94	

*indicates a regression coefficient which is significantly different from zero
(*$\rho \leq .05$; **$\rho \leq .01$)

Appendix Table I3-5

REGRESSION MODELS FOR 3rd GRADE TOTAL MATH
FOR NFT HEAD START, NO PRESCHOOL
AND OTHER PRESCHOOL CHILDREN

Variables Blocked In Order of Entry	Head Start			No Preschool			Other Preschool		
	b	S.E.	Beta	b	S.E.	Beta	b	S.E.	Beta
Age	- .50*	.20	- .12	- .17	.13	- .03	- .21	.20	- .03
Sex	.80	1.74	.02	- .71	1.07	- .01	- .20	1.55	- .00
Income	.02	.04	.03	.03	.02	.03	.02	.04	.02
Occupation	.17	.53	.01	- .07	.33	- .01	.11	.44	.07
Mother's Education	.86	.95	.04	- .28	.66	- .01	.63	1.00	.03
Missing SES	.91	.79	.05	-1.63**	.43	-1.03	-1.20	.79	- .05
White vs. Black	- .37	1.46	- .01	- .07	.89	- .00	5.18**	1.39	.22
White vs. Other	.53	2.01	.01	2.61*	1.10	.08	-3.61	2.15	.10
Kindergarten Entry									
WRAT	.13	.10	.08	.41**	.06	.24	.00	.09	.00
PSI	- .10	.20	- .03	- .20	.14	- .05	.47*	.20	.11
MAT First Grade									
Reading	.16*	.08	.15	.13**	.03	.14	.29**	.06	.25
Math	.96**	.11	.67	.82**	.05	.49	.76**	.09	.44
Constant	34.15	13.86		21.48*	9.62		12.49	13.59	

*indicates a regression coefficient which is significantly different from zero
(*$\rho \leq .05$; **$\rho \leq .01$)

Appendix Table I3-6

REGRESSION MODELS FOR FIRST GRADE MATH COMPUTATIONS FOR NFT HEAD START, NO PRESCHOOL AND OTHER PRESCHOOL CHILDREN

Variables Blocked In Order of Entry	Head Start			No Preschool			Other Preschool		
	b	S.E.	Beta	b	S.E.	Beta	b	S.E.	Beta
Age	0.21	0.09	0.13	-0.00	0.05	-0.00	0.06	0.09	0.03
Sex	0.08	0.81	0.00	-0.37	0.48	-0.02	0.22	0.68	0.01
Income	0.03	0.01	0.11	0.01	0.01	0.05	0.01	0.01	0.05
Occupation	0.58	0.24	0.15	0.17	0.15	0.04	0.59	0.19	0.20
Mother's Education	-0.56	0.44	-0.08	0.03	0.29	0.00	-1.15	0.44	-0.17
Missing SES	-0.13	0.37	-0.01	-0.11	0.19	-0.02	0.35	0.35	0.05
White vs. Black	2.57	0.67	0.31	1.12**	0.40	0.14	0.95	0.62	0.13
White vs. Other	-0.39	0.93	-0.03	-0.29	0.49	-0.02	1.03	0.94	0.08
Kindergarten Entry									
WRAT	0.21	0.04	0.34	0.17**	0.02	0.30	0.19	0.03	0.34
PSI	0.13	0.09	0.09	0.25**	0.06	0.20	0.16	0.08	0.12
MAT First Grade									
Reading									
Math									
Constant	-16.66	6.51		60	4.32		-3.56	6.11	

indicates a regression coefficient which is significantly different from zero ($\rho \leq .05$; **$\rho \leq .01$)

Appendix Table I3-7

REGRESSION MODELS FOR 3RD GRADE MATH COMPUTATIONS
FOR NFT HEAD START, NO PRESCHOOL
AND OTHER PRESCHOOL CHILDREN

Variables Blocked In Order of Entry	Head Start			No Preschool			Other Preschool		
	b	S.E.	Beta	b	S.E.	Beta	b	S.E.	Beta
Age	- .12	.09	- .08	- .02	.05	- .01	- .12	.09	- .06
Sex	- .13	.82	- .00	- .18	.43	- .01	.08	.70	.00
Income	.00**	.01	.00	.00	.01	.01	- .00	.01	- .03
Occupation	- .02	.25	- .00	- .08	.13	- .02	.04	.20	.01
Mother's Education	- .15	.45	- .02	- .17	.27	- .02	.58	.45	.07
Missing SES	- .02	.37	- .00	- .55	.17	- .09	- .44	.36	- .06
White vs. Black	- .36	.69	- .04	- .18	.36	- .02	1.72	.63	.20
White vs. Other	- .52	.95	- .04	.78	.44	.07	-1.08	.97	- .08
Kindergarten Entry									
WRAT	.04	.05	.07	.13**	.02	.22	- .03	.04	- .05
PSI	- .16	.09	- .12	- .13*	.05	- .09	.14	.09	.09
MAT First Grade									
Reading	.09*	.03	.23	.05**	.01	.16	.09**	.02	.22
Math	.31**	.05	.58	.28**	.02	.40	.26**	.04	.42
Constant	14.73	6.55		8.19	3.93		9.36	6.21	

*indicates a regression coefficient which is significantly different from zero
(*$\rho \leq .05$; **$\rho \leq .01$)

Appendix Table I3-8

REGRESSION MODELS FOR FIRST GRADE MATH CONCEPTS FOR
NFT HEAD START, NO PRESCHOOL AND OTHER PRESCHOOL CHILDREN

Variables Blocked In Order of Entry	Head Start			No Preschool			Other Preschool		
	b	S.E.	Beta	b	S.E.	Beta	b	S.E.	Beta
Age	0.08	0.09	0.05	0.02	0.05	0.01	0.01	0.08	0.00
Sex	1.02	0.79	0.07	0.94	0.45	0.06	1.71**	0.63	0.12
Income	-0.00	0.01	-0.00	0.02*	0.01	0.07	0.01	0.01	0.04
Occupation	0.09	0.24	0.02	0.10	0.14	0.02	0.52**	0.17	0.18
Mother's Education	-0.17	0.43	-0.02	0.26	0.27	0.03	-0.77*	0.40	-0.11
Missing SES	0.30	0.36	0.04	0.39	0.18	0.07	0.51	0.32	0.07
White vs. Black	1.11	0.65	0.14	-0.37	0.37	-0.04	0.27	0.57	0.03
White vs. Other	0.85	0.91	0.07	0.16	0.46	0.01	0.61	0.87	0.05
Kindergarten Entry									
WRAT	0.25**	0.04	0.43	0.20**	0.02	0.37	0.20**	0.03	0.38
PSI	0.27**	0.09	0.22	0.32**	0.05	0.25	0.30**	0.08	0.22
MAT First Grade									
Reading									
Math									
Constant	0.22	6.36		2.94	4.04		3.06	5.65	

*indicates a regression coefficient which is significantly different from zero
(*$\rho \leq .05$; **$\rho \leq .01$)

Appendix Table I3-9

REGRESSION MODELS FOR 3RD GRADE MATH CONCEPTS
FOR NFT HEAD START, NO PRESCHOOL
AND OTHER PRESCHOOL CHILDREN

Variables Blocked In Order of Entry	Head Start			No Preschool			Other Preschool		
	b	S.E.	Beta	b	S.E.	Beta	b	S.E.	Beta
Age	- .21*	.08	- .13	- .07	.05	- .03	- .01	.07	- .00
Sex	.20	.71	.01	.11	.42	.00	.10	.59	.00
Income	.00	.01	.00	.00	.01	.00	.00	.01	.01
Occupation	.12	.21	.03	.02	.13	.00	.23	.17	.06
Mother's Education	.39	.39	.05	- .02	.20	- .00	- .13	.38	- .01
Missing SES	.42	.32	.06	- .68**	.17	- .11	- .16	.30	- .02
White vs. Black	- .15	.59	- .01	- .35	.35	- .04	1.80**	.53	.21
White vs. Other	.07	.82	.00	1.35**	.43	.11	1.69*	.82	- .12
Kindergarten Entry									
WRAT	.08*	.04	.14	.14**	.02	.23	.00	.03	.00
PSI	.02	.03	.04	- .02	.55	- .01	.18*	.07	.11
MAT First Grade									
Reading	.02	.03	.04	.05**	.01	.14	.12**	.02	.28
Math	.36**	.04	.66	.29**	.02	.47	.26**	.03	.41
Constant	11.99	5.66		6.85	3.80		- 1.22	5.27	

*indicates a regression coefficient which is significantly different from zero
(*$p \leq .05$; **$p \leq .01$)

Appendix Table I3-10

CORRELATIONS BETWEEN BACKGROUND MEASURES AND OUTCOME MEASURES FOR NFT HEAD START GRADUATES

									FIRST GRADE				THIRD GRADE					
	Age	Sex	Occupation	Income	Mother's Education	Missing SES	White vs. Black	White vs. Spanish	WRAT	PSI	Total Math	Math Computations	Math Concepts	Reading	Total Math	Math Computations	Math Concepts	Math Problem Solving
Sex	.06																	
Occupation	.16	.03																
Income	.16	-.01	.42															
Mother's Education	.13	.04	.42	.30														
Missing SES	-.15	-.09	-.02	-.00	-.01													
White vs. Black	.29	.06	.22	.17	-.01	-.17												
White vs. Spanish	.20	.03	.21	.15	.17	-.07	.67											
WRAT	.11	-.06	.16	.17	.10	.02	.25	.17										
PSI	.26	.06	.22	.17	.05	-.03	.36	.20	.61									
Total Math	.29	.05	.29	.25	.06	-.04	.50	.34	.63	.59								
Math Computations	.32	.02	.33	.31	.06	-.09	.51	.33	.53	.50	.91							
Math Concepts	.21	.07	.19	.15	.05	.00	.40	.30	.62	.57	.91	.67						
Reading	.26	-.10	.24	.33	.18	.01	.38	.36	.63	.48	.72	.64	.69					
Total Math	.12	.02	.27	.26	.13	.04	.36	.29	.58	.46		.63	.72	.67				
Math Computations	.10	-.02	.16	.19	.04	.00	.26	.17	.48	.33	.66	.72	.58	.59	.88			
Math Concepts	.09	.02	.26	.22	.12	.05	.34	.25	.60	.49	.76	.68	.72	.61	.93	.72		
Math Problem Solving	.13	.06	.30	.31	.20	.06	.40	.36	.49	.44	.71	.64	.66	.61	.89	.66	.79	
Reading	.17	-.01	.32	.29	.16	.05	.39	.33	.57	.46	.71	.62	.69	.77	.77	.64	.76	.69

Appendix Table I3-11

CORRELATIONS BETWEEN BACKGROUND MEASURES AND OUTCOME MEASURES FOR NFT CHILDREN WITH NO PRESCHOOL

										FIRST GRADE				THIRD GRADE					
	Age	Sex	Occupation	Income	Mother's Education	Missing SES	White vs. Black	White vs. Spanish	WRAT	PSI	Total Math	Math Computations	Math Concepts	Reading	Total Math	Math Computations	Math Concepts	Math Problem Solving	
Sex	.00																		
Occupation	.07	.04																	
Income	.07	.02	.39																
Mother's Education	.05	.05	.41	.33															
Missing SES	-.20	-.01	-.01	-.02	-.01														
White vs. Black	.27	-.04	.24	.21	.18	-.41													
White vs. Spanish	.14	-.02	.30	.24	.38	-.18	.67												
WRAT	.10	-.15	.28	.24	.23	.04	.32	.30											
PSI	.11	-.05	.25	.26	.26	-.08	.43	.47	.67										
Total Math	.09	-.05	.25	.25	.22	-.03	.29	.28	.58	.54									
Math Computations	.09	-.09	.23	.22	.18	-.10	.34	.28	.50	.48	.91								
Math Concepts	.06	-.00	.23	.24	.22	.04	.19	.24	.55	.51	.90	.66							
Reading	.04	-.12	.24	.23	.22	-.07	.32	.32	.55	.45	.57	.53	.51						
Total Math	.07	-.09	.24	.25	.21	-.14	.34	.34	.61	.50	.72	.66	.65	.58					
Math Computations	.07	-.08	.19	.20	.17	-.13	.28	.27	.54	.41	.66	.63	.57	.53	.91				
Math Concepts	.06	-.06	.24	.23	.22	-.14	.33	.35	.59	.50	.70	.63	.64	.56	.93	.77			
Math Problem Solving	.05	-.11	.24	.28	.20	-.12	.34	.32	.57	.47	.65	.59	.60	.52	.93	.78	.82		
Reading	.07	-.11	.25	.29	.24	-.10	.40	.39	.64	.55	.61	.54	.57	.62	.77	.67	.75	.73	

Appendix Table I3-12

CORRELATIONS BETWEEN BACKGROUND MEASURES AND OUTCOME MEASURES FOR NFT CHILDREN WITH SOME PRESCHOOL

									FIRST GRADE				THIRD GRADE					
	Age	Sex	Occupation	Income	Mother's Education	Missing SES	White vs. Black	White vs. Spanish	WRAT	PSI	Total Math	Math Computations	Math Concepts	Reading	Total Math	Math Computations	Math Concepts	Math Problem Solving
Sex	.03																	
Occupation	.11	.05																
Income	-.06	.05	.52															
Mother's Education	.05	.14	.60	.51														
Missing SES	-.24	-.09	-.03	-.03	-.01													
White vs. Black	.20	.09	.38	.43	.24	-.41												
White vs. Spanish	.07	.09	.46	.50	.42	-.29	.77											
WRAT	.16	-.05	.41	.35	.39	-.12	.37	.38										
PSI	.19	.00	.33	.37	.34	-.15	.44	.43	.63									
Total Math	.14	.05	.45	.37	.28	-.08	.43	.43	.62	.55								
Math Computations	.14	.00	.40	.33	.22	-.10	.42	.41	.53	.46	.91							
Math Concepts	.12	.09	.41	.35	.29	-.05	.36	.37	.59	.53	.90	.65						
Reading	.16	-.02	.39	.36	.31	-.12	.41	.46	.65	.54	.71	.63	.65					
Total Math	.14	.03	.41	.40	.30	-.20	.53	.47	.58	.57	.76	.68	.70	.70				
Math Computations	.10	.05	.36	.32	.28	-.17	.45	.41	.47	.47	.65	.59	.59	.59	.90			
Math Concepts	.17	.03	.43	.38	.28	-.16	.50	.44	.58	.56	.75	.67	.70	.70	.93	.75		
Math Problem Solving	.13	.01	.36	.41	.28	-.22	.52	.47	.57	.55	.70	.62	.65	.64	.93	.75	.88	
Reading	.21	-.00	.45	.45	.36	-.22	.56	.54	.62	.64	.66	.62	.57	.75	.77	.65	.76	.73

Appendix Table I3-13

CORRELATION BETWEEN PREDICTED AND OBSERVED SCORES
FOR SPONSORS' PRESCHOOL GROUPS

	N	Reading		Total Math		Math Computations		Math Concepts	
RESPONSIVE EDUCATION									
Head Start	62	0.57	0.72	0.54	0.72	0.29	0.60	0.68	0.66
No Preschool	23	0.51	0.66	0.63	0.64	0.58	0.54	0.61	0.64
Some Preschool	40	0.78	0.81	0.75	0.81	0.70	0.69	0.67	0.77
TEEM									
Head Start	91	0.40	0.69	0.59	0.73	0.41	0.65	0.60	0.71
No Preschool	65	0.68	0.79	0.76	0.81	0.73	0.72	0.70	0.76
Some Preschool	14	0.62	0.80	0.57	0.50	0.13	0.33	0.83	0.64
BANK STREET									
Head Start	25	0.26	0.69	0.53	0.70	0.39	0.57	0.49	0.71
No Preschool	34	0.50	0.58	0.54	0.47	0.41	0.41	0.59	0.62
Some Preschool	45	0.54	0.74	0.49	0.54	0.40	0.34	0.44	0.62
DIRECT INSTRUCTION									
Head Start	110	0.50	0.78	0.50	0.75	0.43	0.70	0.45	0.69
No Preschool	18	0.59	0.76	0.65	0.78	0.62	0.69	0.57	0.80
Some Preschool	51	0.62	0.71	0.58	0.72	0.49	0.52	0.56	0.73
BEHAVIOR ANALYSIS									
Head Start	163	0.44	0.59	0.48	0.68	0.35	0.62	0.54	0.62
No Preschool	85	0.39	0.61	0.53	0.74	0.47	0.72	0.52	0.70
Some Preschool	57	0.46	0.50	0.39	0.40	0.37	0.34	0.35	0.34
COGNITIVE CURRICULUM									
Head Start	59	0.33	0.73	0.66	0.53	0.50	0.39	0.57	0.56
No Preschool	15	0.72	0.64	0.74	0.62	0.59	0.50	0.64	0.65
Some Preschool	20	0.72	0.45	0.62	0.48	0.40	0.45	0.60	0.57
PARENT EDUCATION									
Head Start	44	0.55	0.66	0.65	0.66	0.61	0.59	0.44	0.60
No Preschool	52	0.57	0.74	0.42	0.60	0.31	0.45	0.51	0.63
Some Preschool	43	0.81	0.80	0.70	0.71	0.54	0.62	0.74	0.71
EDC									
Head Start	37	0.35	0.59	0.38	0.55	0.31	0.40	0.40	0.51
No Preschool	26	0.61	0.76	0.67	0.64	0.66	0.54	0.58	0.62
Some Preschool	65	0.15	0.57	0.41	0.59	0.37	0.52	0.41	0.58
IELP									
Head Start	33	0.49	0.82	0.61	0.87	0.50	0.74	0.63	0.86
No Preschool	36	0.62	0.73	0.43	0.74	0.32	0.67	0.40	0.76
Some Preschool	21	0.82	0.89	0.58	0.75	0.29	0.71	0.69	0.72
SEDL									
Head Start	105	0.34	0.56	0.58	0.69	0.47	0.56	0.59	0.69
No Preschool	73	0.64	0.69	0.64	0.72	0.61	0.74	0.54	0.68
Some Preschool	84	0.06	0.47	0.51	0.51	0.48	0.47	0.42	0.48
CAL PROCESS									
Head Start	24	0.62	0.70	0.55	0.61	0.32	0.64	0.66	0.56
No Preschool	21	0.78	0.80	0.82	0.78	0.76	0.79	0.77	0.72
Some Preschool	58	0.43	0.55	0.52	0.58	0.45	0.44	0.50	0.55

Appendix Table I3-14

MEANS AND STANDARD DEVIATIONS FOR RAW OUTCOME MEASURES
FOR NFT CHILDREN

	Head Start N=175		No Preschool N=646		Some Preschool N=286	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
WRAT	28.9	12.0	28.4	12.8	33.4	12.7
First Grade MAT						
Total Math	29.45	13.21	33.53	13.01	34.94	12.74
Math Computations	11.44	7.37	13.23	7.25	13.91	7.10
Math Concepts	18.01	7.06	20.30	7.01	21.02	6.92
Reading	43.79	17.31	44.63	23.03	47.49	18.59
Third Grade MAT						
Total Math	48.16	18.93	51.20	21.50	53.41	22.01
Math Computations	17.76	7.15	18.42	7.73	19.09	7.97
Math Concepts	17.10	6.44	18.31	8.16	19.25	8.28
Reading	45.12	19.20	47.09	19.27	49.35	19.59

Appendix Table I4-1

CHARACTERISTICS OF THE RESPONSIVE EDUCATION CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		125	62	23	40
PERCENT OF CHILDREN		100.0	49.6	18.4	32.0
ENTRY AGE IN MONTHS	Mean	65.7	65.9	64.5	66.1
	Standard Deviation	4.0	4.1	3.7	3.9
	Median	65.8	66.0	63.8	65.8
SEX	Percent Female	56.0	54.8	47.8	62.5
FAMILY INCOME ($100)	Mean	48.7	38.5	70.0	53.9
	Standard Deviation	27.4	22.6	26.3	28.1
	Median	42.0	31.5	79.2	47.0
	Percent Missing	29.6	30.6	43.5	20.0
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		5.7	4.7	0	9.4
FAMILY SIZE	Mean	5.6	5.5	5.8	5.6
	Standard Deviation	2.3	2.3	2.3	2.3
	Median	4.9	4.8	5.0	5.1
	Percent Missing	26.4	29.0	39.1	15.0
HIGHEST OCCUPATION IN HOUSE	Mean	13.5	13.2	14.7	13.5
	Standard Deviation	2.0	1.8	1.2	2.5
	Median	12.8	12.4	14.9	12.5
	Percent Missing	32.0	32.3	43.5	25.0
MOTHER'S EDUCATION	Mean	5.4	5.3	5.8	5.5
	Standard Deviation	1.0	0.9	0.7	1.3
	Median	5.6	5.4	5.9	5.6
	Percent Missing	30.4	32.3	39.1	22.5
CHILDREN'S ETHNICITY	Percent Black	53.6	48.4	26.1	77.5
	Percent White	40.0	46.8	69.6	12.5
	Percent Spanish Surname	6.4	4.8	4.3	10.0
FIRST LANGUAGE	Percent English	96.0	98.4	95.7	92.5
	Percent Spanish	4.0	1.6	4.3	7.5
PERCENT BILINGUAL CHILDREN		6.4	6.5	4.3	7.5
KINDERGARTEN WRAT	Mean	28.1	28.4	33.1	24.8
	Standard Deviation	12.7	12.2	11.8	13.3
	Median	26.1	25.5	32.0	21.5
KINDERGARTEN PSI	Mean	17.8	17.6	19.3	17.1
	Standard Deviation	4.9	5.0	4.5	5.0
	Median	18.1	17.8	19.7	17.5

Appendix Table I4-2

PATTERNS FOR RESPONSIVE EDUCATION CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE															
				Head Start				No Preschool				Some Preschool				Overall			
				-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	11	10	14	35	5	4	3	12	11	8	6	25	27	22	23	72
		%		18	16	23	56	22	17	13	52	28	20	15	62	22	18	18	58
		N	0	8	2	0	10	1	1	1	3	1	2	5	8	10	5	6	21
		%		13	3	0	16	8	4	4	13	3	5	13	20	8	4	5	17
		N	+	6	5	6	17	1	2	5	8	4	1	2	7	11	8	13	32
		%		10	8	10	28	4	9	22	35	10	3	5	18	9	6	10	25
		N		25	17	20	62	7	7	9	23	16	11	13	40	48	35	42	125
		%		40	28	32	χ^2=18.1*	30	30	40	χ^2=5.3	40	28	32	χ^2=17.2*	38	28	34	χ^2=27.6*
	Total Math	N	-	8	5	8	21	2	2	5	9	4	8	6	16	14	15	19	48
		%		13	8	13	34	9	9	22	40	10	20	15	45	11	12	15	38
		N	0	9	4	6	19	2	3	2	7	3	1	5	9	14	8	13	35
		%		15	7	10	31	9	13	9	30	8	3	13	22	11	6	11	28
		N	+	14	1	7	22	2	2	3	7	3	4	6	13	19	7	16	42
		%		23	2	11	35	9	9	13	30	8	10	15	33	15	6	13	34
		N		31	10	21	61	6	7	10	23	10	13	17	40	47	30	48	125
		%		50	16	34	χ^2=10.2	26	30	44	χ^2=2.7	25	33	42	χ^2=7.5	38	24	38	χ^2=5.8
	Math Computations	N	-	6	8	7	21	3	1	3	7	2	5	6	13	11	14	16	41
		%		10	13	11	34	13	4	13	30	5	13	15	33	9	12	13	33
		N	0	3	3	4	10	2	5	4	11	6	3	5	14	11	11	13	35
		%		5	5	7	16	9	22	18	48	15	8	13	35	9	9	10	28
		N	+	16	5	10	31	2	1	2	5	0	7	6	13	18	13	18	49
		%		26	8	16	50	9	4	9	22	0	18	15	32	14	10	14	39
		N		25	16	21	62	7	7	9	23	8	15	17	40	40	38	47	125
		%		40	26	34	χ^2=9.4	30	30	40	χ^2=7.2	20	38	42	χ^2=12.0	32	30	38	χ^2=1.8
	Math Concepts	N	-	8	7	10	25	3	4	4	11	7	6	4	17	18	17	18	53
		%		13	11	16	40	13	17	17	48	18	15	10	42	14	14	14	42
		N	0	8	4	6	18	1	4	1	6	3	3	5	11	12	11	12	35
		%		13	7	10	29	4	17	4	26	8	8	13	28	10	9	10	28
		N	+	9	3	7	19	1	2	3	6	3	1	8	12	13	6	18	37
		%		15	5	11	31	4	9	13	26	8	3	20	30	10	5	14	30
		N		25	14	23	62	5	10	8	23	13	10	17	40	43	34	48	125
		%		40	23	37	χ^2=2.6	22	43	35	χ^2=5.4	33	25	42	χ^2=4.5	35	27	48	χ^2=4.9

Note. — * indicates a χ^2 with $p \leq .1$.

☐ indicates that a significant number of children displayed the pattern.

Appendix Table I4-3

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES FOR FIRST GRADE AND THIRD GRADE FOR RESPONSIVE EDUCATION CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 62)															
Reading	38.43	15.25	46.64	-4.38*	13.05	-2.2	39.83	17.61	45.9	-2.59	12.31	-1.3	-6.16*	14.77	-3.3
Total Math	30.43	11.64	47.87	.48	10.44	0.4	45.80	21.10	47.3	-1.54	14.67	-0.7	-2.92	17.84	-1.4
Math Computations	12.33	6.23	48.89	1.09	6.80	1.5	17.12	6.74	48.2	.02	5.46	0.0	-.77	6.13	-1.0
Math Concepts	18.09	7.04	47.09	-.60	5.15	-0.9	16.16	8.49	47.1	-1.05	6.37	-1.3	-.56	7.24	-0.7
NO PRESCHOOL (N = 23)															
Reading	45.78	17.96	50.2	-3.32	15.68	-1.6	50.73	17.09	51.8	1.02	12.99	.5	-2.53	16.10	-1.3
Total Math	35.04	10.84	51.4	-1.13	8.44	-.8	55.30	17.06	51.9	1.96	13.73	.9	-1.62	17.29	-.7
Math Computations	14.82	5.39	52.3	.31	4.39	.4	20.00	6.96	51.9	0.97	5.96	1.2	-0.11	7.03	-.1
Math Concepts	20.21	6.39	50.1	-1.44	5.07	-2.0	20.43	6.76	52.6	0.91	5.29	1.1	-0.10	6.10	-.1
SOME PRESCHOOL (N = 40)															
Reading	32.27	17.26	43.5	-5.98*	10.90	-2.9	35.90	19.71	43.8	-.33	11.56	-.1	-4.13	13.58	-2.2
Total Math	27.37	12.84	45.4	-.78	8.58	-.6	43.52	21.04	46.2	4.43*	12.45	2.1	1.32	15.65	.6
Math Computations	10.92	6.72	46.9	.42	4.82	.5	15.67	7.60	46.3	.86	5.49	1.1	.08	6.42	.1
Math Concepts	16.45	7.21	44.7	-1.21	5.36	-1.7	15.70	8.28	46.5	1.70*	5.32	2.1	.48	6.45	.6

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

☐ indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-4

CHARACTERISTICS OF THE TUCSON
EARLY EDUCATION MODEL

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		170	91	65	14
PERCENT OF CHILDREN		100.0	53.5	38.2	8.2
ENTRY AGE IN MONTHS	Mean	66.0	66.8	64.6	67.4
	Standard Deviation	4.6	4.3	4.4	5.6
	Median	65.7	66.7	64.7	67.4
SEX	Percent Female	54.1	53.8	53.8	57.1
FAMILY INCOME ($100)	Mean	57.7	50.0	71.8	65.6
	Standard Deviation	26.3	24.2	25.0	25.7
	Median	52.3	47.5	75.0	57.0
	Percent Missing	41.2	33.0	60.0	7.1
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		11.0	3.3	26.9	15.4
FAMILY SIZE	Mean	6.0	6.4	5.2	5.4
	Standard Deviation	2.1	2.3	1.7	1.8
	Median	5.5	6.0	4.8	4.8
	Percent Missing	41.2	33.0	60.0	7.1
HIGHEST OCCUPATION IN HOUSE	Mean	13.8	13.4	14.8	13.5
	Standard Deviation	1.8	1.5	1.9	2.4
	Median	13.2	13.0	15.6	13.1
	Percent Missing	42.9	35.2	61.5	7.1
MOTHER'S EDUCATION	Mean	5.5	5.4	5.7	5.6
	Standard Deviation	0.8	0.8	0.6	1.1
	Median	5.6	5.4	5.8	5.7
	Percent Missing	44.7	37.4	60.0	21.4
CHILDREN'S ETHNICITY	Percent Black	44.1	64.8	10.8	64.3
	Percent White	49.4	25.3	87.7	28.6
	Percent Spanish Surname	6.5	9.9	1.5	7.1
FIRST LANGUAGE	Percent English	96.5	94.5	98.5	100.0
	Percent Spanish	3.5	5.5	1.5	0
PERCENT BILINGUAL CHILDREN		5.3	7.7	1.5	7.1
KINDERGARTEN WRAT	Mean	31.4	28.2	35.7	32.6
	Standard Deviation	13.6	12.4	14.5	11.8
	Median	29.9	27.0	33.4	30.5
KINDERGARTEN PSI	Mean	17.6	16.7	19.2	16.1
	Standard Deviation	4.9	4.6	4.7	6.1
	Median	18.1	16.9	20.0	14.5

Appendix Table I4-5

PATTERNS FOR THE TUCSON EARLY EDUCATION CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE															
				Head Start				No Preschool				Some Preschool				Overall			
				-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	18	16	6	40	[18]	6	8	32	2	2	0	4	[38]	24	14	[76]
		%		20	18	7	44	[28]	9	12	49	14	14	0	29	[23]	14	8	[45]
		N	0	13	3	4	20	5	5	8	18	1	1	[4]	6	19	9	16	44
		%		14	3	4	22	8	8	12	38	7	7	[29]	43	11	5	10	26
		N	+	17	7	7	31	5	2	8	15	2	0	2	4	24	9	17	50
		%		19	8	8	34	8	3	12	23	14	0	14	28	14	5	10	29
		N		[48]	26	17	91	28	13	24	65	5	3	6	14	[81]	42	47	170
		%		[52]	29	19	χ^2=14.4*	43	20	37	χ^2=9.8	36	21	43	χ^2=8.8	[48]	25	27	χ^2=20.6*
	Total Math	N	-	10*	13	8	31	8	10	14	32	1*	2*	[6]	[9]	19*	25	28	72
		%		11	14	9	34	12	15	22	49	7	14	[43]	[64]	11	15	16	42
		N	0	13	6	8	27	5	8	7	20	0	1	2	3	18	15	17	50
		%		14	7	9	30	8	12	11	31	0	7	14	22	11	9	10	30
		N	+	18	3	12*	33	2	2	9	13	2	0	0	2	22	5	21	48
		%		20	3	13	36	3	3	14	20	14	0	0	14	13	3	12	28
		N		41	22	28	91	15	20	30	65	3	3	[8]	14	59	45	66	170
		%		45	24	31	χ^2=9.1	23	31	46	χ^2=13.6*	21	21	[58]	χ^2=17.2*	35	26	39	χ^2=16.1
	Math Computations	N	-	11	7	14	32	7	9	9	25	1	3	[5]	[9]	19	19	28	66
		%		12	8	15	35	11	14	14	39	7	21	[36]	[64]	11	11	16	39
		N	0	9	5	5	19	5	8	15	28	0	0	1	1	14	13	21	48
		%		10	6	6	21	8	12	23	43	0	0	7	7	8	8	12	28
		N	+	18	8	14	40	4	1	7	12	1	1	2	4	23	10	23	56
		%		20	9	15	44	6	2	11	18	7	7	14	29	14	6	14	33
		N		38	20	33	91	16	18	31	65	2	4	[8]	14	56	42	72	170
		%		42	22	36	χ^2=6.4	24	28	48	χ^2=16.2*	14	29	[57]	χ^2=11.5	33	25	42	χ^2=6.2
	Math Concepts	N	-	16	9	10	35	8	9	13	30	2	[4]	2	[8]	26	22	25	73
		%		18	10	11	38	12	14	20	46	14	[29]	14	[57]	15	13	15	43
		N	0	14	8	8	30	6	9	4	19	2	0	3	5	22	17	15	54
		%		15	9	9	33	9	14	6	29	14	0	21	36	13	10	9	32
		N	+	14	7	5	26	6	1	9	16	0	0	1	1	20	8	15	43
		%		15	8	6	29	9	2	14	25	0	0	7	7	12	4	9	25
		N		44	24	23	91	20	19	26	65	4	4	6	14	68	47	55	170
		%		48	27	25	χ^2=7.1	31	29	40	χ^2=10.6	29	29	42	χ^2=10.1	40	28	32	χ^2=11.8

Note. -- * indicates a χ^2 with $p \leq .1$.

[ ] indicates that a significant number of children displayed the pattern.

Appendix Table I4-6

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES FOR FIRST GRADE AND THIRD GRADE FOR TEEM CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 91)															
Reading	41.01	15.55	47.9	-1.16	15.29	-.5	37.60	14.54	44.7	-5.23*	11.07	[-2.7]	-7.14*	15.30	[-3.8]
Total Math	28.75	10.50	46.5	.24	8.84	.1	44.03	18.67	46.4	-2.13	12.85	-1.9	-3.30	16.00	-1.6
Math Computations	11.24	6.39	47.3	.61	6.07	.8	16.81	7.82	47.8	-.28	5.97	-.3	-.88	6.92	-1.1
Math Concepts	17.51	5.46	46.2	-.37	4.57	-.5	15.16	6.85	45.8	-1.39*	4.83	-1.7	-.82	5.73	-1.0
NO PRESCHOOL (N = 65)															
Reading	48.83	17.73	51.7	-2.82	13.05	-1.3	50.55	21.09	51.7	-1.25	13.31	-.6	-5.72*	15.88	[-3.0]
Total Math	35.58	11.08	51.8	-1.43	7.21	-1.1	59.50	21.24	54.0	4.88*	12.47	2.3	.28	15.20	.1
Math Computations	14.13	5.96	51.4	-.88	4.09	-1.2	21.10	7.63	53.4	1.62*	5.34	2.1	.25	6.13	.3
Math Concepts	21.44	5.79	51.8	-.54	4.11	-.7	21.00	7.55	53.3	1.03	4.89	1.3	-.24	5.45	-.3
SOME PRESCHOOL (N = 14)															
Reading	45.14	17.69	49.9	.43	14.34	.2	45.78	20.09	49.1	1.98	12.14	1.0	1.03	15.19	.5
Total Math	26.14	7.77	44.5	-5.28*	8.38	[-4.1]	49.50	21.00	49.1	6.59	10.38	3.2	2.43	20.36	1.1
Math Computations	9.14	5.33	44.4	-3.11	6.57	-4.3	20.14	8.42	52.1	4.70*	8.02	[6.1]	3.35	8.86	4.3
Math Concepts	17.00	4.73	45.5	-2.16*	3.00	[-3.0]	16.21	7.24	47.2	.77	5.54	.9	-.68	6.53	-.8

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-7

CHARACTERISTICS OF THE
BANK STREET CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		104	25	34	45
PERCENT OF CHILDREN		100.0	24.0	32.7	43.3
ENTRY AGE IN MONTHS	Mean	63.6	64.2	62.4	64.1
	Standard Deviation	4.2	4.4	4.0	4.0
	Median	63.3	63.9	61.2	64.3
SEX	Percent Female	51.9	44.0	55.9	53.3
FAMILY INCOME ($100)	Mean	57.6	46.8	73.5	59.8
	Standard Deviation	27.0	24.9	24.1	26.8
	Median	52.0	43.0	81.0	57.0
	Percent Missing	47.1	12.0	64.7	53.3
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		10.9	4.5	16.7	14.3
FAMILY SIZE	Mean	5.3	5.1	4.8	6.0
	Standard Deviation	2.0	1.9	1.7	2.3
	Median	5.1	5.0	4.8	5.8
	Percent Missing	45.2	12.0	58.8	53.3
HIGHEST OCCUPATION IN HOUSE	Mean	14.5	14.2	14.2	15.0
	Standard Deviation	2.2	1.5	2.0	2.9
	Median	13.9	13.5	13.5	14.3
	Percent Missing	45.2	12.0	58.8	53.3
MOTHER'S EDUCATION	Mean	5.6	5.4	5.4	6.0
	Standard Deviation	.9	.8	.6	1.2
	Median	5.6	5.4	5.4	6.0
	Percent Missing	48.1	12.0	61.8	57.8
CHILDREN'S ETHNICITY	Percent Black	69.2	40.0	73.5	82.2
	Percent White	29.8	56.0	26.5	17.8
	Percent Spanish Surname	0	0	0	0
FIRST LANGUAGE	Percent English	97.1	100.0	94.1	97.8
	Percent Spanish	0	0	0	0
PERCENT BILINGUAL CHILDREN		2.9	0	5.9	2.2
KINDERGARTEN WRAT	Mean	30.8	28.5	27.2	34.8
	Standard Deviation	13.1	11.0	13.2	13.1
	Median	28.8	27.0	25.0	31.4
KINDERGARTEN PSI	Mean	16.5	17.4	13.6	18.2
	Standard Deviation	5.7	3.8	6.4	5.3
	Median	17.0	17.2	14.0	18.0

Appendix Table I4-8

PATTERNS FOR THE BANK STREET CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE															
				Head Start				No Preschool				Some Preschool				Overall			
				-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	3	6	3	12	2	3	5	10	9	5	5	19	14	14	13	41
		%		12	24	12	48	6	9	15	29	20	11	11	42	13	13	13	39
		N	0	2	1	3	6	[10]	3	3	16	8	1	4	13	20	5	10	35
		%		8	4	12	24	[29]	9	9	47	18	2	9	29	19	5	10	34
		N	+	1	1	5	7	4	0	4	8	4	2	7	13	9	3	16	28
		%		4	4	20	28	12	0	12	24	9	4	16	29	9	3	15	27
		N		6	8	11	25	16	6	12	34	21	8	16	45	43	22	39	104
		%		24	32	44	χ^2=5.3	47	18	35	χ^2=18.0*	47	18	35	χ^2=7.3	41	21	38	χ^2=15.6*
	Total Math	N	-	3	[7]	5	[15]	3	2	1	6	5	7	9	21	11	16	15	42
		%		12	[28]	20	[60]	9	6	3	18	11	16	20	47	11	15	14	41
		N	0	0	2	2	4	5	1	2	8	2	4	1	7	7	7	5	19
		%		0	8	8	16	15	3	6	23	5	9	2	15	7	7	4	18
		N	+	3	1	2	6	[13]	2	5	[20]	9	8	0	17	[25]	11	7	43
		%		12	4	8	24	[38]	6	15	[59]	20	18	0	38	[24]	11	7	41
		N		6	10	9	25	[21]	5	8	34	16	19	10	45	43	34	27	104
		%		24	40	36	χ^2=9.4	[62]	15	23	χ^2=21.0*	36	42	22	χ^2=19.1*	41	33	26	χ^2=19.7*
	Math Computations	N	-	3	4	5	12	*4	2	2	8	6	5	6	17	13	11	13	37
		%		12	16	20	48	12	6	6	24	13	11	13	38	13	10	13	36
		N	0	2	2	3	7	5	1	2	8	2	5	2	9	9	8	7	24
		%		8	8	12	28	5	3	6	24	4	11	4	20	8	8	7	23
		N	+	2	1	3	6	[13]	2	3	[18]	10	5	4	19	[25]	8	10	43
		%		8	4	12	24	[38]	6	9	[52]	22	11	9	42	[24]	8	9	41
		N		17	7	11	25	[22]	5	7	34	18	15	12	45	[47]	27	30	104
		%		28	28	44	χ^2=3.1	[65]	15	20	χ^2=19.5*	40	33	27	χ^2=5.4	[45]	26	29	χ^2=10.0
	Math Concepts	N	-	1	6	[7]	[14]	*4	2	1	7	6	6	8	20	*11	14	16	41
		%		4	24	[28]	[56]	12	6	3	21	13	13	18	45	11	13	15	39
		N	0	2	3	2	7	6	1	2	9	7	3	1	11	15	7	5	27
		%		8	12	8	28	18	3	6	26	16	7	2	24	14	7	5	26
		N	+	2	1	1	4	8	7	3	[18]	9	4	1	14	19	12	5	36
		%		8	4	4	16	24	21	9	[53]	20	9	2	31	18	12	5	35
		N		5	10	10	25	[18]	10	6	34	22	13	10	45	45	33	26	104
		%		20	40	40	χ^2=10.9	[53]	29	18	χ^2=16.3*	49	29	22	χ^2=13.6*	43	32	25	χ^2=15.1*

Note. -- * indicates a χ^2 with $p \leq .1$.

☐ indicates that a significant number of children displayed the pattern.

Appendix Table I4-9

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES FOR FIRST GRADE AND THIRD GRADE FOR BANK STREET CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 23)															
Reading	40.48	14.21	47.6	-3.78	15.94	-1.9	45.40	18.00	49.0	2.37	13.14	1.3	-2.07	15.42	-1.1
Total Math	26.84	11.04	45.1	-4.29*	9.59	[-3.3]	47.56	17.00	48.2	2.37	12.17	1.2	-2.83	13.81	-1.4
Math Computations	10.76	5.93	46.7	-1.51	5.90	-2.1	17.00	6.55	48.1	.74	5.39	1.0	-1.29	5.64	-1.7
Math Concepts	16.08	6.42	44.2	-2.77*	5.65	[-4.0]	16.92	6.11	48.2	.76	4.36	1.0	-.28	4.85	-.4
NO PRESCHOOL (N = 34)															
Reading	41.00	15.07	47.9	1.65	14.05	.8	40.11	17.56	46.1	-1.87	14.40	-1.0	-3.36	14.55	-1.8
Total Math	35.20	11.51	51.6	5.75*	9.92	[4.5]	42.73	18.02	45.8	-6.63*	16.75	[-3.2]	-4.95	16.63	-2.4
Math Computations	13.55	5.96	50.6	2.78*	5.67	[3.9]	15.29	6.77	45.8	-2.97*	6.42	[-3.9]	-2.10	6.22	-2.7
Math Concepts	21.64	6.82	52.2	2.97*	5.53	[4.3]	15.29	7.10	46.1	-2.67*	5.65	[-3.4]	-1.65	6.00	-2.1
SOME PRESCHOOL (N = 45)															
Reading	44.91	16.43	49.8	-.83	14.09	-.4	43.24	17.64	47.8	.37	11.90	.2	-2.46	14.52	-1.3
Total Math	34.11	12.81	50.7	.18	11.24	.1	44.37	16.38	46.6	-3.02	15.09	-1.5	-5.02*	14.06	-2.5
Math Computations	13.64	7.30	50.7	.63	6.74	.9	16.88	7.39	47.9	-.78	7.27	-1.0	-.84	7.09	-1.1
Math Concepts	20.46	7.56	50.5	-.45	6.82	-.6	15.48	6.30	46.3	-1.97*	5.24	[-2.5]	-2.69*	5.38	[-3.4]

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-10

CHARACTERISTICS OF THE DIRECT INSTRUCTION CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		179	110	18	51
PERCENT OF CHILDREN		100	61.0	9.9	29.1
ENTRY AGE IN MONTHS	Mean	64.1	63.9	66.3	63.9
	Standard Deviation	4.1	4.3	4.5	3.5
	Median	64.0	63.6	66.3	64.2
SEX	Percent Female	49.5	50.5	50.0	47.2
FAMILY INCOME ($100)	Mean	40.4	35.4	47.6	46.4
	Standard Deviation	21.7	19.5	24.8	22.8
	Median	32.4	31.1	44.5	43.0
	Percent Missing	53.8	57.7	55.6	45.3
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		1.2	0	0	3.4
FAMILY SIZE	Mean	5.6	5.9	4.9	5.2
	Standard Deviation	2.4	2.6	1.6	2.3
	Median	5.2	5.6	4.5	4.6
	Percent Missing	53.3	56.8	55.6	45.3
HIGHEST OCCUPATION IN HOUSE	Mean	13.4	13.2	13.7	13.7
	Standard Deviation	1.6	1.3	1.7	1.9
	Median	13.0	12.9	13.2	13.2
	Percent Missing	57.7	59.5	61.1	52.8
MOTHER'S EDUCATION	Mean	5.2	5.1	5.6	5.4
	Standard Deviation	.9	.9	.8	.8
	Median	5.3	5.2	5.4	5.6
	Percent Missing	55.5	57.7	61.1	49.1
CHILDREN'S ETHNICITY	Percent Black	80.2	73.9	94.4	88.7
	Percent White	19.2	26.1	5.6	9.4
	Percent Spanish Surname	.5	0	0	1.9
FIRST LANGUAGE	Percent English	99.5	99.1	100.00	100.0
	Percent Spanish	0	0	0	0
PERCENT BILINGUAL CHILDREN		1.1	.9	5.6	0
KINDERGARTEN WRAT	Mean	29.8	29.6	25.6	31.5
	Standard Deviation	10.4	10.5	8.6	10.4
	Median	28.2	27.4	25.5	30.6
KINDERGARTEN PSI	Mean	17.7	17.5	15.8	18.9
	Standard Deviation	5.0	4.8	5.6	4.9
	Median	18.6	17.8	17.2	19.8

Appendix Table I4-11

PATTERNS FOR THE DIRECT INSTRUCTION CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE															
				Head Start				No Preschool				Some Preschool				Overall			
				-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	7	5	2	14	1	0	0	1	4	4	4	12	12	9	6	27
		%		6	5	2	13	6	0	0	6	8	8	8	24	7	5	3	15
		N	0	18	6	3	27	1	1	2	4	5	5	2	12	24	12	7	43
		%		16	6	3	24	6	6	11	22	10	10	4	24	13	7	4	24
		N	+	42	15	12	69	4	3	6	13	10	3	14	27	56	21	32	109
		%		38	14	11	63	22	17	33	72	20	6	28	52	31	12	18	61
		N		67	26	17	110	6	4	8	18	19	12	20	51	92	42	45	179 *
		%		61	24	15	χ^2=46.2 *	33	22	45	χ^2=13.0 *	37	24	39	χ^2=11.1	51	24	25	χ^2=84.4
	Total Math	N	-	4	6	14	24	3	3	3	9	2	7	11	20	9	16	28	53
		%		4	6	13	22	17	17	17	50	4	14	22	39	5	9	16	30
		N	0	12	7	12	31	0	0	4	4	5	0	9	14	17	7	25	49
		%		11	6	11	28	0	0	22	22	10	0	18	28	9	4	14	27
		N	+	18	6	31	55	1	0	4	5	3	4	10	17	22	10	45	77
		%		16	6	28	50	6	0	22	28	6	8	20	33	12	6	25	43
		N		34	19	57	110 *	4	3	11	18	10	11	30	51 *	48	33	98	179 *
		%		31	17	52	χ^2=24.4	22	17	61	χ^2=10.8	20	21	59	χ^2=17.6	27	18	55	χ^2=37.2
	Math Computations	N	-	6	3	13	22	1	2	4	7	4	3	10	17	11	8	27	46
		%		6	3	12	20	6	11	22	39	8	6	20	33	6	5	15	26
		N	0	2	5	12	19	1	3	2	6	3	4	6	13	6	12	20	38
		%		2	5	11	17	6	17	11	33	6	8	12	26	3	7	11	21
		N	+	10	8	51	69	1	0	4	5	3	7	11	21	14	15	66	95
		%		9	7	46	63	6	0	22	28	6	14	22	41	8	8	37	53
		N		18	16	76	110 *	3	5	10	18	10	14	27	51	31	35	113	179
		%		16	15	69	χ^2=43.0 *	17	28	55	χ^2=7.9	20	27	53	χ^2=9.7	17	20	63	χ^2=76.8 *
	Math Concepts	N	-	17	8	17	42	4	2	3	9	6	4	12	22	27	14	32	73
		%		16	7	16	38	22	11	17	50	12	8	24	43	15	8	18	41
		N	0	11	12	10	33	0	2	5	7	4	4	9	17	15	18	24	57
		%		10	11	9	30	0	11	28	39	8	8	18	33	8	10	13	32
		N	+	10	5	20	35	1	0	1	2	3	5	4	12	14	10	25	49
		%		9	5	18	32	6	0	6	11	6	10	8	24	8	6	14	27
		N		38	25	47	110	5	4	9	18	13	13	25	51	56	42	81	179 *
		%		34	23	43	χ^2=9.4	28	22	50	χ^2=11.6	25	25	50	χ^2=10.5	31	24	45	χ^2=15.0

Note. -- * indicates a χ^2 with $p \leq .1$.

☐ indicates that a significant number of children displayed the pattern.

Appendix Table I4-12

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES FOR FIRST GRADE AND THIRD GRADE FOR DIRECT INSTRUCTION CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 110)															
Reading	50.21	16.27	52.4	9.80*	14.31	[4.8]	43.76	15.86	48.1	-7.39*	9.89	[-3.9]	-2.49	14.90	-1.3
Total Math	31.83	11.09	48.9	3.90*	9.87	[3.0]	58.63	21.86	53.6	6.09*	14.95	[3.0]	9.38*	19.01	[4.6]
Math Computations	13.04	6.25	49.8	3.63*	5.78	[5.1]	23.90	8.68	57.1	4.68*	6.43	[6.1]	6.01*	7.51	[7.8]
Math Concepts	18.79	6.12	48.1	.27	5.65	.4	19.31	7.69	51.3	.35	5.56	.4	2.22*	6.83	[2.8]
NO PRESCHOOL (N = 18)															
Reading	51.61	17.79	53.2	15.59*	14.42	[7.7]	43.72	15.82	48.1	3.42	10.33	1.8	3.22	12.36	1.7
Total Math	28.00	10.21	46.0	-1.71	7.79	-1.3	51.94	23.54	50.3	9.27*	15.35	[4.5]	7.21	18.53	3.5
Math Computations	10.38	6.74	46.2	-.20	5.45	-.3	19.88	9.65	51.8	3.73*	7.27	[4.9]	3.15	8.10	4.4
Math Concepts	17.61	4.60	46.4	-1.51	3.82	-2.2	17.66	8.45	49.1	1.91	5.29	2.4	1.55	6.49	2.0
SOME PRESCHOOL (N = 51)															
Reading	49.25	17.68	52.0	5.69*	13.99	[2.8]	44.19	17.52	48.3	.26	12.28	.1	.43	16.20	.2
Total Math	31.07	12.21	48.4	-1.58	10.01	-1.2	52.41	19.72	50.5	6.15*	13.74	[3.0]	4.98	17.79	2.4
Math Computations	12.05	6.83	48.5	-.21	5.98	-.3	20.29	8.13	52.4	2.98*	6.99	[3.9]	3.08*	7.80	[4.0]
Math Concepts	19.02	6.16	48.4	-1.36	5.10	-1.9	18.52	7.40	50.2	1.37	5.06	1.8	1.09	6.64	1.4

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-13

CHARACTERISTICS OF THE BEHAVIOR ANALYSIS MODEL

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		305	163	85	57
PERCENT OF CHILDREN		100.0	53.6	27.8	18.6
ENTRY AGE IN MONTHS	Mean	63.8	64.0	63.4	64.0
	Standard Deviation	3.6	3.3	3.8	4.2
	Median	63.9	63.8	63.4	64.3
SEX	Percent Female	56.2	59.1	55.3	49.1
FAMILY INCOME ($100)	Mean	43.1	38.8	46.6	48.5
	Standard Deviation	26.6	23.2	30.9	27.6
	Median	37.2	33.0	39.0	33.0
	Percent Missing	45.1	47.6	50.6	29.8
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		5.4	1.2	14.3	5.0
FAMILY SIZE	Mean	6.0	5.9	6.6	5.4
	Standard Deviation	2.6	2.7	2.6	2.2
	Median	5.3	5.2	6.4	4.8
	Percent Missing	42.2	45.1	47.1	26.3
HIGHEST OCCUPATION IN HOUSE	Mean	13.4	13.2	13.6	13.4
	Standard Deviation	1.7	1.7	2.0	1.6
	Median	12.9	12.8	13.1	12.8
	Percent Missing	44.8	48.2	48.2	29.8
MOTHER'S EDUCATION	Mean	5.4	5.4	5.1	5.5
	Standard Deviation	.9	1.0	.9	.8
	Median	5.4	5.5	5.2	5.6
	Percent Missing	48.4	51.2	51.8	35.1
CHILDREN'S ETHNICITY	Percent Black	90.8	88.4	91.8	96.5
	Percent White	6.2	6.1	8.2	3.5
	Percent Spanish Surname	2.9	5.5	0	0
FIRST LANGUAGE	Percent English	97.4	95.1	100.0	100.0
	Percent Spanish	2.6	4.9	0	0
PERCENT BILINGUAL CHILDREN		2.6	4.9	0	0
KINDERGARTEN WRAT	Mean	27.7	28.4	25.6	28.5
	Standard Deviation	11.2	11.4	11.0	10.6
	Median	25.2	25.5	23.2	26.1
KINDERGARTEN PSI	Mean	15.7	16.1	14.3	16.6
	Standard Deviation	5.1	4.5	5.4	5.8
	Median	15.7	16.2	14.2	17.0

Appendix Table I4-14

PATTERNS FOR THE BEHAVIOR ANALYSIS CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE															
				Head Start				No Preschool				Some Preschool				Overall			
				-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	14	14	13	41	11	7	2	20	6	2	3	11	31	23	18	72
		%		9	9	8	25	13	8	2	24	11	4	5	19	10	8	6	24
		N	0	23	17	8	48	10	7	6	23	7	5	2	14	40	29	16	85
		%		14	10	5	30	12	8	7	27	12	9	4	25	13	9	5	28
		N	+	[41]	14	19	74	14	9	19	42	[25]	3	4	[32]	[80]	26	42	[148]
		%		[25]	9	12	45	17	11	22	49	[44]	5	7	[56]	[26]	9	14	[48]
		N		78	45	40	163	35	23	27	85	[38]	10	9	57	[151]	78	76	305
		%		48	28	24	χ^2=17.8*	41	27	32	χ^2=12.6*	[67]	17	16	χ^2=36.7*	[50]	25	25	χ^2=66.3*
	Total Math	N	-	8	7	7	22	5	5	6	16	0	3	5	8	13	15	18	46
		%		5	4	4	13	6	6	7	19	0	5	9	14	4	5	6	15
		N	0	9	6	11	26	11	4	3	18	1	4	3	8	21	14	17	52
		%		6	4	7	16	13	5	4	21	2	7	5	14	7	5	5	17
		N	+	[56]	26	33	[115]	19	10	[22]	[51]	[22]	11	8	[41]	[97]	47	[63]	[207]
		%		[34]	16	20	[71]	22	12	[26]	[60]	[39]	19	14	[72]	[32]	15	[21]	[68]
		N		73	39	51	163	35	19	31	85	23	18	16	57	131	76	98	305
		%		45	24	31	χ^2=46.8*	41	22	37	χ^2=26.3*	40	32	28	χ^2=38.9*	43	25	32	χ^2=105.4*
	Math Computations	N	-	7	5	11	23	7	5	2	14	3	2	4	9	17	12	17	46
		%		4	3	7	14	8	6	2	16	5	4	7	16	6	4	6	15
		N	0	3	5	8	16	3	8	9	20	4	2	3	9	10	15	20	45
		%		2	3	5	10	4	9	11	24	7	4	5	16	3	5	5	15
		N	+	[45]	25	[54]	[124]	17	15	19	[51]	[20]	7	12	[39]	[82]	47	[85]	[214]
		%		[28]	15	[33]	[76]	20	18	22	[60]	[35]	12	12	[68]	[27]	15	[28]	[70]
		N		55	35	73	163	27	28	30	85	27	11	19	57	109	74	122	305
		%		34	21	45	χ^2=69.4*	32	33	35	χ^2=25.6*	48	19	33	χ^2=26.1*	36	24	40	χ^2=92.2*
	Math Concepts	N	-	12	11	14	37	6	7	5	18	3	0	6	9	21	18	25	64
		%		7	7	9	23	7	8	6	21	5	0	11	16	7	6	8	21
		N	0	24	12	11	47	13	6	6	25	4	2	1	7	41	20	18	79
		%		15	7	7	29	15	7	7	29	7	4	2	12	13	7	6	26
		N	+	[45]	16	18	79	17	13	12	[42]	[25]	7	9	[41]	[87]	36	39	[162]
		%		[28]	10	11	48	20	15	14	[50]	[44]	12	16	[72]	[28]	12	13	[53]
		N		[81]	39	43	163	36	26	23	85	[32]	9	16	57	[149]	74	82	305
		%		[50]	24	26	χ^2=15.8*	42	31	27	χ^2=15.3*	[56]	16	28	χ^2=44.2*	[49]	24	27	χ^2=70.9*

Note. -- * indicates a χ^2 with $p \leq .1$.

[ ] indicates that a significant number of children displayed the pattern.

Appendix Table I4-15

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES FOR FIRST GRADE AND THIRD GRADE FOR BEHAVIOR ANALYSIS CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 163)															
Reading	42.55	19.94	48.7	3.88*	17.94	1.9	42.45	15.94	47.4	-4.32*	14.31	-2.3	-.52	14.38	-.3
Total Math	34.04	12.07	50.7	8.48*	10.76	[6.6]	50.07	18.36	49.4	-3.05*	13.65	-1.5	4.02*	16.40	2.0
Math Computations	15.04	7.04	52.7	6.59*	6.77	[9.2]	20.00	7.44	52.0	.42	5.88	.5	2.77*	6.83	[3.6]
Math Concepts	19.00	6.44	48.4	1.89*	5.43	[2.7]	17.22	6.97	48.5	-2.14*	5.56	[-2.7]	1.37*	6.37	1.8
NO PRESCHOOL (N = 85)															
Reading	43.83	22.58	49.3	7.10*	20.92	[3.5]	42.25	16.13	47.3	.60	13.15	.3	1.73	14.76	.9
Total Math	36.30	13.63	52.4	7.66*	11.60	[6.0]	50.47	19.06	49.6	.40	12.99	.2	5.12*	16.30	[2.5]
Math Computations	15.02	7.73	52.7	4.78*	6.81	[6.7]	19.43	7.06	51.2	.78	4.89	1.0	2.69*	5.96	[3.5]
Math Concepts	21.28	6.70	51.7	2.88*	5.73	[4.1]	17.36	6.69	48.7	-.98	4.94	-1.3	1.04	5.91	1.3
SOME PRESCHOOL (N = 57)															
Reading	50.12	17.22	52.4	10.30*	15.46	[5.1]	34.93	12.35	43.4	-9.07*	12.83	[-4.8]	-4.02*	12.36	-2.1
Total Math	40.26	14.39	55.5	11.22*	13.39	[8.7]	45.84	15.26	47.3	-6.70*	18.01	[-3.3]	3.92*	14.29	1.9
Math Computations	16.42	8.13	54.6	5.77*	7.58	[8.1]	17.94	7.07	49.3	-1.54	7.36	-2.0	2.38*	6.41	[3.1]
Math Concepts	23.84	7.39	55.3	5.45*	7.07	[7.8]	16.40	5.82	47.5	-2.67*	7.09	[-3.4]	1.29	6.04	1.7

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-16

CHARACTERISTICS OF THE COGNITIVE CURRICULUM CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		94	54	15	20
PERCENT OF CHILDREN		100.0	63.2	15.8	21.1
ENTRY AGE IN MONTHS	Mean	64.3	64.0	64.4	65.2
	Standard Deviation	3.8	4.3	2.6	2.7
	Median	65.3	64.8	65.0	65.9
SEX	Percent Female	52.6	56.7	53.3	40.0
FAMILY INCOME ($100)	Mean	45.7	46.3	37.4	47.9
	Standard Deviation	27.3	27.7	18.0	30.4
	Median	37.7	38.0	30.8	40.5
	Percent Missing	13.7	8.3	40.0	10.0
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		8.5	7.3	11.1	16.7
FAMILY SIZE	Mean	6.3	6.0	6.8	6.7
	Standard Deviation	2.8	2.9	2.6	2.9
	Median	5.7	5.2	7.0	6.4
	Percent Missing	12.6	8.3	40.0	5.0
HIGHEST OCCUPATION IN HOUSE	Mean	13.5	13.4	13.7	13.7
	Standard Deviation	1.8	1.7	1.8	2.1
	Median	12.9	12.9	13.0	12.9
	Percent Missing	14.7	10.0	40.0	10.0
MOTHER'S EDUCATION	Mean	5.4	5.2	5.5	5.6
	Standard Deviation	1.3	1.3	1.2	1.4
	Median	5.5	5.3	5.8	5.9
	Percent Missing	15.8	11.7	46.7	5.0
CHILDREN'S ETHNICITY	Percent Black	76.8	76.7	73.3	80.0
	Percent White	10.5	11.7	13.3	5.0
	Percent Spanish Surname	12.6	11.7	13.3	15.0
FIRST LANGUAGE	Percent English	93.7	93.3	93.3	95.0
	Percent Spanish	6.3	6.7	6.7	5.0
PERCENT BILINGUAL CHILDREN		10.5	10.0	6.7	15.0
KINDERGARTEN WRAT	Mean	29.0	29.6	24.5	30.6
	Standard Deviation	12.2	12.7	10.8	11.5
	Median	27.8	28.2	20.3	28.2
KINDERGARTEN PSI	Mean	16.8	16.9	14.6	18.0
	Standard Deviation	4.6	4.6	4.1	4.2
	Median	17.3	17.6	16.0	19.5

Appendix Table I4-17

PATTERNS FOR THE COGNITIVE CURRICULUM CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

KINDERGARTEN TO FIRST GRADE			FIRST GRADE TO THIRD GRADE													
			Head Start				No Preschool				Some Preschool				Overall			
			-	0	+		-	0	+		-	0	+		-	0	+	
Reading	N	-	13	12	11	[36]	3	[4]	1	[8]	[8]	1	[6]	[15]	[24]	17	18	[59]
	%		22	20	19	[61]	20	[27]	7	[53]	[40]	5	[30]	[75]	[26]	18	18	[63]
	N	0	8	4	3	15	1	0	2	3	2	1	1	4	11	5	6	22
	%		14	7	5	25	7	0	13	20	10	5	5	20	12	5	6	23
	N	+	2	1	5	8	1	0	3	4	0	0	1	1	3	1	9	13
	%		3	2	9	14	7	0	20	27	0	0	5	5	3	1	10	14
	N		23	17	19	59	5	4	6	15	[10]	2	8	20	38	23	33	94
	%		39	29	32	χ^2=17.9*	33	27	40	χ^2=8.8	[50]	10	40	χ^2=20.4*	40	25	35	χ^2=34.4*
Total Math	N	-	13	10	13	[36]	1	1	[6]	[8]	4	4	[9]	[17]	18	15	[28]	[61]
	%		22	17	22	[61]	7	7	[40]	[54]	20	20	[45]	[85]	19	16	[30]	[65]
	N	0	7	4	9	20	3	0	2	5	0	2	0	2	10	6	11	27
	%		12	7	15	34	20	0	13	33	0	10	0	10	11	6	12	29
	N	+	1	1	1	3	1	0	1	2	0	0	1	1	2	1	3	6
	%		2	2	2	5	7	0	7	13	0	0	5	5	2	1	3	6
	N		21	15	23	59	5	1	[9]	15	4	6	[10]	20	30	22	[42]	94
	%		36	25	39	χ^2=23.8*	33	7	[60]	χ^2=14.6*	20	30	[50]	χ^2=29.5*	32	23	[45]	χ^2=51.0*
Math Computations	N	-	12	12	[16]	[40]	3	0	[6]	[9]	4	4	6	[14]	[19]	16	[28]	[63]
	%		20	20	[27]	[68]	20	0	[40]	[60]	20	20	30	[70]	[20]	17	[30]	[67]
	N	0	6	3	4	13	1	1	2	4	0	2	3	5	7	6	9	22
	%		10	5	7	22	7	7	13	27	0	10	15	25	8	6	10	23
	N	+	3	0	3	6	1	1	0	2	0	0	1	1	4	1	4	9
	%		5	0	5	10	7	7	0	13	0	0	5	5	4	1	4	10
	N		21	15	23	59	5	2	[8]	15	4	6	[10]	20	30	23	41	94
	%		36	25	29	χ^2=23.9*	33	13	[54]	χ^2=15.3*	20	30	[50]	χ^2=14.7*	32	24	44	χ^2=48.2*
Math Concepts	N	-	14	12	7	[33]	2	2	5	[9]	1	[5]	[7]	[13]	17	[19]	[19]	[55]
	%		24	10	12	[56]	13	13	33	[60]	5	[25]	[35]	[65]	18	[20]	[20]	[59]
	N	0	4	8	3	15	0	2	0	2	1	1	1	3	5	11	4	20
	%		7	14	5	25	0	13	0	13	5	5	5	15	5	12	4	21
	N	+	3	3	5	11	2	1	1	4	2	1	1	4	7	5	7	19
	%		5	5	9	19	13	7	7	27	10	5	5	20	8	5	8	20
	N		21	23	15	59	4	5	6	15	4	7	9	20	29	35	30	94
	%		36	39	25	χ^2=17.0*	27	33	40	χ^2=10.4	20	35	45	χ^2=16.9*	31	37	32	χ^2=44.7*

Note. -- * indicates a χ^2 with $p \leq .1$.

[ ] indicates that a significant number of children displayed the pattern.

Appendix Table I4-18

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES FOR FIRST GRADE AND THIRD GRADE FOR COGNITIVE CURRICULUM CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 54)															
Reading	32.66	14.38	43.8	-8.58*	15.02	[-4.2]	34.27	15.56	43.0	-.40	10.74	-.2	-8.28*	15.75	[-4.4]
Total Math	21.25	9.97	40.7	-6.26*	7.62	[-4.9]	38.22	15.35	43.6	-.20	13.51	-.1	-7.99*	16.36	[-3.9]
Math Computations	6.15	5.62	40.3	-4.05*	5.03	[-5.7]	14.23	5.93	44.5	-.29	5.73	-.4	-3.37*	6.60	[-4.4]
Math Concepts	15.10	6.48	42.8	-2.21*	5.35	[-3.2]	12.93	5.92	43.0	-.99	5.11	-1.3	-2.84*	6.02	[-3.6]
NO PRESCHOOL (N = 15)															
Reading	36.40	15.83	45.6	.22	11.47	.1	37.26	19.95	44.6	1.19	15.43	.6	-2.32	16.95	-1.2
Total Math	24.40	11.10	43.2	-4.19	7.98	[-3.1]	44.40	21.12	46.6	5.76	16.57	2.8	.32	17.25	.2
Math Computations	7.80	5.49	42.6	-2.62*	4.45	[-3.7]	16.40	8.50	47.3	1.78	7.39	2.1	.06	7.17	.1
Math Concepts	16.60	6.34	45.0	-1.56	4.98	-2.2	15.00	7.60	45.7	.82	5.78	1.1	-.87	6.53	-1.1
SOME PRESCHOOL (N = 20)															
Reading	31.35	13.10	43.1	-10.08*	9.05	[-5.0]	38.35	18.38	45.2	3.10	16.93	1.7	-3.54	17.71	-1.9
Total Math	20.45	12.17	40.1	-10.10*	9.71	[-7.9]	41.10	17.10	45.0	6.52	16.40	3.3	-4.57	16.87	-2.2
Math Computations	6.15	6.06	40.3	-5.20*	5.57	[-7.3]	15.05	6.59	45.5	1.95	6.12	2.5	-1.67	6.79	-2.2
Math Concepts	14.30	8.44	41.7	-4.90*	7.05	[-7.0]	14.35	6.35	44.9	2.01	5.55	2.6	-2.12	5.94	-2.7

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-19

CHARACTERISTICS OF THE PARENT EDUCATION CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		139	44	52	43
PERCENT OF CHILDREN		100.00	31.7	37.4	30.9
ENTRY AGE IN MONTHS	Mean	66.1	67.9	65.7	64.6
	Standard Deviation	4.8	5.3	4.4	4.4
	Median	66.4	67.8	66.4	64.7
SEX	Percent Female	60.4	50.0	63.5	67.4
FAMILY INCOME ($100)	Mean	51.7	38.2	67.1	49.6
	Standard Deviation	29.8	20.5	30.3	30.5
	Median	43.7	32.3	72.0	42.7
	Percent Missing	33.8	36.4	44.2	18.6
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		16.3	3.6	31.0	14.3
FAMILY SIZE	Mean	5.4	5.4	5.6	5.3
	Standard Deviation	2.0	1.5	2.3	2.1
	Median	5.0	5.0	4.9	5.1
	Percent Missing	29.5	31.8	38.5	16.3
HIGHEST OCCUPATION IN HOUSE	Mean	13.7	13.6	14.0	13.4
	Standard Deviation	2.0	1.9	2.3	1.9
	Median	13.1	13.0	13.5	12.8
	Percent Missing	30.9	34.1	38.5	18.6
MOTHER'S EDUCATION	Mean	5.4	5.2	5.4	5.4
	Standard Deviation	1.0	1.0	1.1	.9
	Median	5.3	5.2	5.4	5.5
	Percent Missing	33.1	36.4	40.4	20.9
CHILDREN'S ETHNICITY	Percent Black	62.6	61.4	48.1	81.4
	Percent White	28.1	29.5	38.5	14.0
	Percent Spanish Surname	9.4	9.1	13.5	4.7
FIRST LANGUAGE	Percent English	92.8	90.9	92.3	95.3
	Percent Spanish	7.2	9.1	7.7	4.7
PERCENT BILINGUAL CHILDREN		9.4	9.1	13.5	4.7
KINDERGARTEN WRAT	Mean	27.9	29.9	25.7	28.6
	Standard Deviation	11.4	11.4	11.3	11.4
	Median	25.9	27.5	24.8	26.8
KINDERGARTEN PSI	Mean	17.2	18.2	16.3	17.4
	Standard Deviation	4.7	3.7	5.1	4.9
	Median	17.6	18.7	17.2	17.2

Appendix Table I4-20

PATTERNS FOR THE PARENT EDUCATION CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE															
				Head Start				No Preschool				Some Preschool				Overall			
				-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	10	7	9	26	10	9	1	20	12	4	6	22	32	20	16	68
		%		23	16	21	59	19	17	2	39	28	9	14	51	23	14	12	49
		N	0	6	3	2	11	9	8	4	21	7	2	2	11	22	13	8	43
		%		14	7	5	25	17	15	8	40	16	5	5	26	15	9	6	31
		N	+	1	3	3	7	2	1	8	11	1	4	5	10	4	8	16	28
		%		2	2	7	16	4	10	15	21	2	9	12	23	3	6	12	20
		N		17	13	14	44	21	18	13	52	20	10	13	43	58	41	40	139
		%		37	29	32	χ^2=13.6*	40	35	25	χ^2=14.2*	47	23	30	χ^2=12.8*	42	29	29	χ^2=22.8*
	Total Math	N	-	5	3	4	12	*8	1	3	12	3	1	4	8	*16	5	11	32
		%		11	7	9	28	15	2	6	23	7	2	9	19	11	3	8	23
		N	0	6	7	3	16	9	6	2	17	7	6	3	16	22	19	8	49
		%		14	16	7	36	17	12	4	33	16	14	7	37	16	14	6	35
		N	+	10	3	3	16	13	2	8	23	9	6	4	19	32	11	15	58
		%		23	7	7	36	25	4	15	44	21	14	9	44	23	8	11	42
		N		21	13	10	44	30	9	13	52	19	13	11	43	70	35	34	139
		%		48	29	23	χ^2=6.7*	58	17	25	χ^2=17.5*	44	30	26	χ^2=10.5*	50	25	25	χ^2=24.7*
	Math Compu-tations	N	-	4	6	5	15	*6	1	5	12	3	3	1	7	13	10	11	34
		%		9	14	11	34	12	2	10	23	7	7	2	16	9	7	8	24
		N	0	5	3	1	9	6	6	3	15	6	6	4	16	17	15	8	40
		%		11	7	2	20	12	12	6	29	14	14	9	37	12	11	6	29
		N	+	6	6	8	20	11	6	*8	25	11	8	1	20	28	20	17	65
		%		14	14	18	46	21	12	15	48	26	19	2	47	20	15	12	47
		N		15	15	14	44	23	13	16	52	20	17	6	43	58	45	36	139
		%		34	34	32	χ^2=3.9	44	25	31	χ^2=8.6*	46	40	14	χ^2=17.9*	42	32	26	χ^2=18.8*
	Math Concepts	N	-	8	4	3	15	9	6	5	20	5	1	5	11	22	11	13	46
		%		18	9	7	34	17	12	10	38	12	2	12	26	16	8	9	33
		N	0	10	2	5	17	6	3	6	15	6	5	5	16	22	10	16	48
		%		23	5	11	39	12	6	12	29	14	12	12	37	16	7	12	35
		N	+	5	4	3	12	11	2	4	17	9	5	2	16	25	11	9	45
		%		11	9	7	27	21	4	8	33	21	12	5	37	18	8	6	32
		N		23	10	11	44	26	11	15	52	20	11	12	43	69	32	38	139
		%		52	23	25	χ^2=8.0	50	21	29	χ^2=7.5	46	26	28	χ^2=4.2	50	23	27	χ^2=16.6*

Note. -- * indicates a χ^2 with $p \leq .1$.

☐ indicates that a significant number of children displayed the pattern.

Appendix Table I4-21

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES
FOR FIRST GRADE AND THIRD GRADE FOR PARENT EDUCATION CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 44)															
Reading	38.77	12.82	46.8	-4.41*	10.99	-2.2	40.70	16.73	46.4	-1.59	12.63	-.8	-5.55*	15.36	[-3.0]
Total Math	30.63	10.74	48.0	.15	8.22	.1	43.27	15.45	46.1	-3.55	11.74	-1.7	-5.47*	13.92	[-2.7]
Math Computations	12.18	6.26	48.7	.75	4.95	1.0	16.09	6.69	46.9	-1.04	5.39	-1.4	-2.01*	5.82	[-2.6]
Math Concepts	18.45	5.78	47.6	-.60	5.32	-.9	15.25	6.13	46.0	-1.86*	5.04	-2.4	-1.53	5.95	-2.0
NO PRESCHOOL (N = 52)															
Reading	41.01	14.10	47.9	1.07	12.11	.5	41.92	16.39	47.1	-.92	11.05	-.5	-2.38	13.37	-1.3
Total Math	33.53	10.73	50.3	2.56	10.15	2.0	44.28	16.96	46.6	-3.61	13.83	-1.8	-3.59	15.72	-1.8
Math Computations	14.23	6.69	51.6	2.31*	6.58	[3.2]	16.44	6.61	47.3	-1.13	5.98	-1.5	-.93	6.49	-1.2
Math Concepts	19.30	5.49	48.8	.25	4.84	.4	15.48	6.70	46.3	-1.87*	5.24	-2.4	-1.58	6.17	-2.0
SOME PRESCHOOL (N = 43)															
Reading	38.46	18.44	46.7	-2.46	11.92	-1.2	38.20	18.81	45.1	-1.77	11.35	-.9	-3.09	13.88	-1.7
Total Math	33.83	11.63	50.5	4.39*	8.46	[3.4]	42.02	18.86	45.5	-3.98	13.52	-1.9	-2.01	13.73	-1.0
Math Computations	13.86	6.39	51.0	2.76*	5.38	[3.9]	14.81	5.87	45.2	-2.28*	4.79	[-3.0]	-1.36	4.58	-1.8
Math Concepts	19.97	6.09	49.8	1.63*	4.23	2.3	14.76	7.83	45.4	-1.65	5.51	-2.1	-1.01	5.90	-1.3

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-22

CHARACTERISTICS OF THE EDC
OPEN EDUCATION CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		128	37	26	65
PERCENT OF CHILDREN		100.0	28.5	20.8	50.8
ENTRY AGE IN MONTHS	Mean	63.3	64.2	63.4	62.7
	Standard Deviation	3.8	3.8	3.6	3.7
	Median	63.0	63.7	63.6	62.8
SEX	Percent Female	48.5	54.1	48.1	45.5
FAMILY INCOME ($100)	Mean	54.4	46.7	75.3	53.4
	Standard Deviation	26.6	20.9	29.2	26.3
	Median	49.9	42.0	92.0	50.2
	Percent Missing	21.5	18.9	48.1	12.1
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		8.8	0	28.6	8.6
FAMILY SIZE	Mean	6.1	6.0	7.1	5.8
	Standard Deviation	2.1	2.2	2.2	1.9
	Median	6.0	5.9	6.5	5.9
	Percent Missing	16.9	13.5	40.7	9.1
HIGHEST OCCUPATION IN HOUSE	Mean	13.8	13.4	14.8	13.8
	Standard Deviation	1.8	1.4	1.7	1.9
	Median	13.3	13.2	14.5	13.2
	Percent Missing	21.5	18.9	40.7	15.2
MOTHER'S EDUCATION	Mean	5.4	5.2	5.6	5.4
	Standard Deviation	.8	.8	.6	.8
	Median	5.3	5.2	5.5	5.4
	Percent Missing	19.2	18.9	40.7	10.6
CHILDREN'S ETHNICITY	Percent Black	58.5	48.6	25.9	77.3
	Percent White	41.5	51.4	74.1	22.7
	Percent Spanish Surname	0	0	0	0
FIRST LANGUAGE	Percent English	100.0	100.0	100.0	100.0
	Percent Spanish	0	0	0	0
PERCENT BILINGUAL CHILDREN		0	0	0	0
KINDERGARTEN WRAT	Mean	28.5	26.9	30.3	28.6
	Standard Deviation	12.0	11.2	12.7	12.2
	Median	27.5	26.0	28.2	27.8
KINDERGARTEN PSI	Mean	16.9	16.3	18.6	16.5
	Standard Deviation	5.3	4.9	5.1	5.5
	Median	17.0	16.6	20.0	16.4

Appendix Table I4-23

PATTERNS FOR THE EDC OPEN EDUCATION CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE											
				Head Start				No Preschool				Some Preschool			
				-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	[12]	4	8	[24]	[9]	4	1	[14]	10	4	13	27
		%		[32]	11	22	[65]	[35]	15	4	[54]	15	6	20	41
		N	0	5	2	1	8	2	3	2	7	9	4	1	14
		%		14	5	8	22	8	12	8	27	14	6	2	22
		N	+	3	0	2	5	2	0	3	5	14	4	6	24
		%		8	0	5	13	8	0	12	19	22	6	9	37
		N		[20]	6	11	37	[13]	7	6	26	[33]	12	20	65
		%		[54]	16	30	χ^2=19.3*	[50]	27	23	χ^2=9.8	[51]	18	31	χ^2=12.5*
	Total Math	N	-	3	1	2	6	2	3	3	8	6	7	6	19
		%		8	3	5	16	8	12	12	31	9	11	9	29
		N	0	6	1	2	9	4	2	1	7	4	5	2	11
		%		16	8	5	24	15	8	4	27	6	8	3	17
		N	+	[14]	2	6	[22]	4	3	4	11	[20]	8	7	[35]
		%		[38]	5	16	[60]	15	12	15	42	[31]	12	11	[54]
		N		[23]	4	10	37	10	8	8	26	30	20	15	65
		%		[62]	11	27	χ^2=20.6*	38	31	31	χ^2=2.4	46	31	23	χ^2=18.7*
	Math Computations	N	-	2	4	1	7	4	3	3	10	8	6	6	20
		%		5	11	3	19	15	12	12	38	12	9	9	31
		N	0	2	0	4	6	5	4	*1	10	5	3	2	10
		%		5	0	11	16	19	15	4	38	8	5	3	15
		N	+	[13]	8	3	[24]	3	1	2	6	13	13	9	[35]
		%		[35]	22	8	[65]	12	4	8	24	20	20	14	[54]
		N		17	12	8	37	12	8	6	26	26	22	17	65
		%		46	32	22	χ^2=21.6*	46	31	23	χ^2=5.7	40	34	26	χ^2=12.3
	Math Concepts	N	-	7	2	2	11	*1	1	4	6	6	3	4	13
		%		19	5	5	30	4	4	15	23	9	5	6	20
		N	0	5	2	2	9	4	2	1	7	10	5	2	17
		%		14	5	5	24	15	8	4	27	15	8	3	26
		N	+	[10]	3	4	17	[8]	3	2	[13]	[20]	6	9	35
		%		[27]	8	11	46	[31]	12	8	[50]	[31]	9	14	54
		N		[22]	7	8	37	[13]	6	6	26	[36]	14	15	65
		%		[59]	19	22	χ^2=9.4	[50]	23	27	χ^2=12.7*	[55]	22	23	χ^2=22.1*

				Overall			
				-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	[31]	12	22	[65]
		%		[24]	9	17	[51]
		N	0	16	9	4	29
		%		13	7	3	23
		N	+	19	4	11	34
		%		15	3	9	26
		N		[66]	25	37	128
		%		[52]	19	29	χ^2=30.0*
	Total Math	N	-	11	11	11	33
		%		9	9	9	26
		N	0	14	8	5	27
		%		11	6	4	21
		N	+	[38]	13	17	[68]
		%		[29]	10	13	[53]
		N		[63]	32	33	128
		%		[49]	25	26	χ^2=31.1*
	Math Computations	N	-	14	13	10	37
		%		11	10	8	29
		N	0	12	7	7	26
		%		10	5	5	20
		N	+	[29]	22	14	[65]
		%		[23]	17	11	[51]
		N		55	42	31	128
		%		43	33	24	χ^2=21.7*
	Math Concepts	N	-	14	6	10	30
		%		11	4	8	23
		N	0	19	9	5	33
		%		15	7	4	26
		N	+	[38]	12	15	[65]
		%		[30]	9	12	[51]
		N		[71]	27	30	128
		%		[56]	21	23	χ^2=40.2*

Note. -- * indicates a χ^2 with $p \leq .1$.

[ ] indicates that a significant number of children displayed the pattern.

Appendix Table I4-24

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES FOR FIRST GRADE AND THIRD GRADE FOR EDC OPEN EDUCATION CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 37)															
Reading	32.27	27.07	43.5	-10.25*	25.53	[-5.1]	35.62	17.44	43.7	-5.00	16.57	-2.7	-9.41*	14.12	[-5.0]
Total Math	34.32	12.43	50.9	5.47*	12.41	[4.3]	42.45	18.75	45.7	-8.34*	16.50	[-4.1]	-5.45*	16.23	[-2.7]
Math Computations	14.05	6.17	51.3	3.08*	6.55	[4.3]	16.40	6.61	47.3	-1.67	6.77	-2.2	-1.29	6.20	-1.7
Math Concepts	20.27	7.23	50.2	2.39*	6.92	[3.4]	13.81	7.51	44.2	-4.74*	6.71	[-6.1]	-2.36*	6.28	[-3.0]
NO PRESCHOOL (N = 26)															
Reading	44.38	18.64	49.6	-3.24	14.91	-1.6	45.88	20.12	49.2	-3.56	13.21	-1.9	-6.28*	14.09	[-3.4]
Total Math	37.84	10.55	53.6	2.83	7.95	2.2	51.34	19.62	50.0	-3.49	15.33	-1.7	-4.14	15.42	-2.0
Math Computations	14.11	5.64	51.4	.13	4.26	.2	18.57	5.75	50.1	-.96	5.11	-1.3	-1.00	5.12	-1.3
Math Concepts	23.73	6.07	55.2	2.70*	4.97	[3.9]	18.84	8.71	50.6	-1.21	6.82	-1.6	-1.13	7.01	-1.4
SOME PRESCHOOL (N = 65)															
Reading	39.72	22.60	47.3	-1.35	23.64	-.7	38.73	17.42	45.4	-1.62	14.98	-.9	-1.97	12.75	-1.1
Total Math	35.66	13.02	51.9	5.53*	12.18	[4.3]	44.23	20.23	46.6	-4.00	16.84	-2.0	-.60	15.77	-.3
Math Computations	13.60	7.49	50.7	2.19*	7.05	[3.1]	16.38	7.24	47.3	-1.51	6.35	-2.0	-.18	6.21	-.2
Math Concepts	22.06	6.64	52.8	3.33*	6.24	[4.8]	15.73	8.06	46.6	-1.36	6.71	-1.7	-.20	6.43	-.3

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($\rho \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-25

CHARACTERISTICS OF THE
INDIVIDUALIZED EARLY LEARNING CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		90	33	36	21
PERCENT OF CHILDREN		100.0	36.7	40.0	23.3
ENTRY AGE IN MONTHS	Mean	66.3	64.3	67.4	67.5
	Standard Deviation	4.7	4.8	4.5	4.1
	Median	66.2	63.8	67.0	67.8
SEX	Percent Female	48.9	51.5	38.9	61.9
FAMILY INCOME ($100)	Mean	69.4	55.3	74.4	81.6
	Standard Deviation	26.3	25.4	22.5	24.6
	Median	72.7	52.0	80.0	87.5
	Percent Missing	14.4	15.2	22.2	0
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		24.7	10.7	25.0	42.9
FAMILY SIZE	Mean	5.4	6.0	5.1	5.1
	Standard Deviation	1.2	1.3	1.0	1.1
	Median	5.1	5.8	4.9	5.0
	Percent Missing	10.0	12.1	13.9	0
HIGHEST OCCUPATION IN HOUSE	Mean	15.6	14.2	16.2	16.6
	Standard Deviation	2.3	2.0	2.2	1.8
	Median	15.9	13.4	16.4	16.8
	Percent Missing	12.2	15.2	16.7	0
MOTHER'S EDUCATION	Mean	6.0	5.8	6.0	6.4
	Standard Deviation	0.7	0.5	0.6	1.0
	Median	6.0	5.9	6.0	6.1
	Percent Missing	12.2	12.1	16.7	4.8
CHILDREN'S ETHNICITY	Percent Black	0	0	0	0
	Percent White	100.0	100.0	100.0	100.0
	Percent Spanish Surname	0	0	0	0
FIRST LANGUAGE	Percent English	100.0	100.0	100.0	100.0
	Percent Spanish	0	0	0	0
PERCENT BILINGUAL CHILDREN		0	0	0	0
KINDERGARTEN WRAT	Mean	38.3	33.2	39.7	43.9
	Standard Deviation	12.4	11.1	12.3	11.8
	Median	37.3	34.0	38.5	46.0
KINDERGARTEN PSI	Mean	21.2	20.4	20.9	23.0
	Standard Deviation	4.1	4.2	3.7	4.0
	Median	21.4	20.4	21.2	24.8

Appendix Table I4-26

PATTERNS FOR THE INDIVIDUALIZED EARLY LEARNING CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

KINDERGARTEN TO FIRST GRADE			FIRST GRADE TO THIRD GRADE															
			Head Start				No Preschool				Some Preschool				Overall			
			-	0	+		-	0	+		-	0	+		-	0	+	
Reading	N	-	4	6	8	[18]	3	2	1	6	2	2	3	7	9	10	12	31
	%		12	18	24	[55]	8	6	3	17	10	10	14	33	10	11	13	35
	N	0	2	2	4	8	0	[9]	5	14	1	3	4	8	3	14	13	30
	%		6	6	12	24	0	[25]	14	39	5	14	19	38	3	16	15	33
	N	+	2	3	2	7	0	4	[12]	16	1	3	2	6	3	10	16	29
	%		6	9	6	21	0	11	[33]	44	5	14	10	29	3	11	18	32
	N		8	11	14	33	3	15	[18]	36	4	8	9	21	15	34	[41]	90
	%		24	33	42	χ^2=9.5	8	42	[50]	χ^2=22.2*	19	38	43	χ^2=5.0	17	38	[45]	χ^2=15.8*
Total Math	N	-	[10]	3	1	14	4	3	1	8	4	1	1	6	[18]	7	3	28
	%		[30]	9	3	43	11	8	3	22	19	5	5	29	[20]	8	3	31
	N	0	4	1	2	7	4	2	4	10	1	2	0	3	9	5	6	20
	%		12	3	6	21	11	6	11	28	5	10	0	14	10	6	7	22
	N	+	5	1	6	12	6	7	5	[18]	4	5	3	[12]	15	13	14	[42]
	%		15	3	18	36	17	19	14	[50]	19	24	14	[57]	17	14	15	[47]
	N		[19]	5	9	33	14	12	10	36	9	8	4	21	[42]	25	23	90
	%		[58]	15	27	χ^2=12.2	39	33	28	χ^2=7.2	43	38	19	χ^2=8.4	[47]	28	25	χ^2=15.8*
Math Computations	N	-	8	3	5	16	6	2	1	9	4	0	1	5	[18]	5	7	30
	%		24	9	15	49	17	3	3	25	19	0	5	24	[20]	6	7	33
	N	0	5	0	1	6	5	1	3	9	[6]	1	1	8	16	2	5	23
	%		15	0	3	18	14	3	8	25	[29]	5	5	38	18	2	6	26
	N	+	3	1	7	11	[9]	7	2	[18]	[6]	1	1	8	[18]	9	10	37
	%		9	3	21	33	[25]	19	6	[50]	[29]	5	5	38	[20]	10	11	41
	N		16	4	13	33	[20]	10	6	36	[16]	2	3	21	[52]	16	22	90
	%		49	12	39	χ^2=10.9	[55]	28	17	χ^2=15.7*	[76]	10	14	χ^2=17.6*	[58]	18	24	χ^2=22.6*
Math Concepts	N	-	7	3	5	15	2	2	0	4	3	0	1	4	12	5	6	23
	%		21	9	15	46	6	6	0	11	14	0	5	19	13	6	7	26
	N	0	3	1	3	7	3	3	7	13	2	3	1	6	8	7	11	26
	%		9	3	9	21	8	8	19	36	10	14	5	29	9	8	12	29
	N	+	4	3	4	11	4	7	8	[19]	4	3	4	[11]	12	13	16	[41]
	%		12	9	12	33	11	19	22	[53]	19	14	19	[52]	13	14	18	[45]
	N		14	7	12	33	9	12	15	36	9	6	6	21	32	25	33	90
	%		43	21	36	χ^2=3.6	25	33	42	χ^2=15.2*	42	29	29	χ^2=6.9	35	28	37	χ^2=7.8

Note. -- * indicates a χ^2 with $p \leq .1$.

[ ] indicates that a significant number of children displayed the pattern.

Appendix Table I4-27

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES
FOR FIRST GRADE AND THIRD GRADE FOR ILM CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 33)															
Reading	46.87	17.61	50.8	-6.02*	15.45	[-3.0]	52.66	16.94	52.8	.50	9.67	.3	-3.82	13.67	-2.0
Total Math	37.15	13.42	53.1	-.59	10.68	-.5	52.90	24.20	50.8	-3.92	13.07	-1.9	-6.06	3.48	-3.0
Math Computations	15.36	7.50	53.1	-.28	6.49	-.4	18.30	8.75	49.8	-1.00	5.96	-1.3	2.11	7.63	-2.8
Math Concepts	21.78	6.65	52.4	-.30	5.18	-.4	19.36	8.95	51.3	-1.27	5.01	-1.6	-.91	7.35	-1.2
NO PRESCHOOL (N = 36)															
Reading	64.88	11.64	59.7	7.33*	9.88	[3.6]	69.66	12.79	61.9	7.26*	8.88	[3.9]	9.06*	9.85	[4.8]
Total Math	45.66	12.62	59.7	4.52*	11.51	[3.5]	67.16	22.78	57.7	-1.80	15.38	-.9	1.80	19.61	.9
Math Computations	18.88	7.42	58.1	1.63	7.08	2.3	21.00	8.76	53.3	-3.19*	6.54	[-4.2]	-1.79	7.88	-2.3
Math Concepts	26.77	6.97	59.5	2.88*	6.41	[4.1]	25.88	6.88	59.6	.69	4.52	.9	2.14*	6.13	[2.7]
SOME PRESCHOOL (N = 21)															
Reading	60.95	16.67	57.8	-.89	10.51	-.4	69.90	14.62	62.0	3.11*	6.70	1.7	2.92	8.91	1.6
Total Math	45.81	10.76	59.8	1.41	8.76	1.1	66.23	25.59	57.3	-5.47	17.63	-2.7	-4.64	21.48	-2.3
Math Computations	18.47	6.84	57.5	-.39	6.60	-.5	20.19	8.61	52.2	-4.41	6.29	-5.8	-4.12*	7.68	[-5.4]
Math Concepts	27.33	5.96	60.3	1.80	4.44	2.6	25.52	8.78	59.2	-.44	6.18	-.6	-.17	7.26	-.2

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{(\text{raw score mean} - \text{NFT mean})}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: S.S. = $\frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-28

CHARACTERISTICS OF THE SEDL CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		262	105	73	84
PERCENT OF CHILDREN		100.0	40.3	27.8	31.9
ENTRY AGE IN MONTHS	Mean	64.5	64.6	64.2	64.5
	Standard Deviation	4.3	4.4	4.4	4.0
	Median	64.2	64.0	63.9	64.5
SEX	Percent Female	51.0	52.8	49.3	50.0
FAMILY INCOME ($100)	Mean	46.9	42.3	47.1	55.8
	Standard Deviation	25.1	23.9	27.1	24.0
	Median	44.0	38.7	43.7	51.5
	Percent Missing	48.7	34.0		58.3
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		5.2	4.3	10.0	2.9
FAMILY SIZE	Mean	6.7	7.1	6.7	6.0
	Standard Deviation	2.7	2.9	2.6	2.4
	Median	6.2	6.6	6.0	5.7
	Percent Missing	46.4	33.0	56.2	54.8
HIGHEST OCCUPATION IN HOUSE	Mean	13.7	13.7	13.8	13.8
	Standard Deviation	2.0	2.1	2.1	1.7
	Median	13.2	13.1	13.3	13.3
	Percent Missing	48.3	36.8	56.2	56.0
MOTHER'S EDUCATION	Mean	4.7	4.8	4.2	4.9
	Standard Deviation	1.5	1.4	1.5	1.5
	Median	4.8	5.0	4.1	5.1
	Percent Missing	49.0	37.7	56.2	57.1
CHILDREN'S ETHNICITY	Percent Black	24.0	32.1	8.2	27.4
	Percent White	14.8	13.2	28.8	4.8
	Percent Spanish Surname	60.8	54.7	61.6	67.9
FIRST LANGUAGE	Percent English	59.7	64.2	56.2	57.1
	Percent Spanish	40.3	35.8	43.8	42.9
PERCENT BILINGUAL CHILDREN		63.9	63.2	65.8	63.1
KINDERGARTEN WRAT	Mean	26.3	24.4	23.5	31.2
	Standard Deviation	12.6	11.8	13.5	11.3
	Median	24.8	23.0	21.0	31.0
KINDERGARTEN PSI	Mean	14.3	13.7	13.3	15.8
	Standard Deviation	6.2	6.0	6.2	6.1
	Median	14.8	14.1	13.9	16.5

Appendix Table I4-29

PATTERNS FOR THE SEDL CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE															
				Head Start				No Preschool				Some Preschool				Overall			
				-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	14	7	11	32	14	11	3	28	13	7	12	32	41	25	26	92
		%		13	7	11	30	19	15	4	38	16	8	14	38	16	9	10	35
		N	0	17	6	8	31	10	9	7	26	9	5	6	20	36	20	21	77
		%		16	6	8	30	14	12	10	36	11	6	7	24	14	8	8	29
		N	+	22	10	10	42	2	6	11	19	14	5	13	32	38	21	34	93
		%		21	10	10	40	3	8	15	26	17	6	16	38	14	8	13	36
		N		[53]	23	29	105 *	26	26	21	73 *	36	17	31	84 *	115	66	81	262 *
		%		50	22	28	χ^2=10.8	36	36	28	χ^2=8.5	43	20	37	χ^2=4.03	44	25	31	χ^2=9.7
	Total Math	N	-	4	8	9	21	10	7	[19]	36	10	15	12	37	24	30	40	94
		%		4	8	9	20	14	10	[26]	49	12	18	14	44	9	11	16	36
		N	0	13	11	9	33	6	2	7	15	11	8	5	24	30	21	21	72
		%		12	11	9	31	8	3	10	21	13	10	6	29	11	8	8	27
		N	+	20	9	22	51	4	6	12	22	13	5	5	23	37	20	39	96
		%		19	9	21	49	6	8	16	30	16	6	6	27	14	8	15	37
		N		37	28	40	105	20	15	[38]	73	34	28	22	84	91	71	100	262
		%		35	27	38	χ^2=14.1 *	27	21	[52]	χ^2=17.8 *	41	33	26	χ^2=13.2 *	35	27	38	χ^2=9.7 *
	Math Computations	N	-	10	7	11	28	6	12	13	31	8	13	8	29	24	32	32	88
		%		10	7	11	27	8	16	18	42	10	16	10	35	9	12	12	34
		N	0	5	5	5	15	3	8	8	19	9	4	8	21	17	17	21	55
		%		5	5	5	14	4	11	11	26	11	5	10	25	7	7	8	21
		N	+	19	14	[29]	[62]	3	4	16	23	18	6	10	34	40	24	[55]	[119]
		%		18	13	[28]	[59]	4	6	22	32	21	7	12	40	15	9	[21]	[45]
		N		34	26	45	105	12	24	[37]	73	35	23	26	84	81	73	108	262
		%		32	25	43	χ^2=4.7 *	16	33	[51]	χ^2=15.3 *	42	27	31	χ^2=8.2 *	31	28	41	χ^2=16.6 *
	Math Concepts	N	-	16	6	9	31	14	12	15	[41]	[22]	12	15	[49]	[52]	30	39	[121]
		%		15	6	9	30	19	16	21	[56]	[43]	14	18	[58]	[20]	11	15	[46]
		N	0	11	10	13	34	5	3	6	14	9	3	5	17	25	16	24	65
		%		11	12	12	32	7	4	8	19	11	4	6	20	10	6	9	25
		N	+	15	11	14	40	3	5	10	18	12	4	2	18	30	20	26	76
		%		14	11	13	38	4	7	14	25	14	5	2	22	11	8	10	29
		N		42	27	36	105	22	20	31	73	[43]	19	22	84	107	66	89	262
		%		40	26	34	χ^2=4.8 *	30	27	43	χ^2=16.0 *	[51]	23	26	χ^2=23.7 *	41	25	34	χ^2=16.4 *

Note. -- * indicates a χ^2 with $p \leq .1$.

☐ indicates that a significant number of children displayed the pattern.

Appendix Table I4-30

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES
FOR FIRST GRADE AND THIRD GRADE FOR SEDL CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 105)															
Reading	34.71	21.62	44.8	.63	20.84	.3	36.99	15.32	44.5	-2.88*	14.57	-1.5	-2.26	15.26	-1.2
Total Math	29.52	11.81	47.2	3.87*	9.75	[3.0]	47.13	17.16	48.0	1.25	12.61	.6	3.87*	15.73	.3
Math Computations	12.65	7.31	49.3	2.66*	6.51	[3.7]	18.66	7.22	50.2	1.00	6.04	1.3	1.74*	6.84	2.3
Math Concepts	16.86	6.17	45.3	1.21*	5.06	1.7	15.95	6.65	46.9	-.60	4.84	-.8	-1.26*	5.78	-1.6
NO PRESCHOOL (N = 73)															
Reading	35.64	11.62	45.3	.66	10.78	.3	35.65	16.10	43.7	-.35	11.75	-.2	-3.93*	13.86	-2.1
Total Math	26.68	12.92	44.9	-1.28	9.97	-1.0	43.64	20.29	46.3	5.35*	14.21	[2.6]	1.41	18.16	.7
Math Computations	10.98	7.41	47.0	.18	5.90	.3	17.32	7.96	48.5	2.75*	5.39	[3.6]	1.64*	7.01	2.1
Math Concepts	15.69	6.55	43.7	-1.46*	5.57	-2.1	14.43	7.48	45.0	.93	5.52	1.2	-.10	6.69	-.1
SOME PRESCHOOL (N = 84)															
Reading	34.15	24.73	44.5	-2.70	25.88	-1.3	37.41	17.73	44.7	.46	16.59	.2	-3.59*	15.43	-1.9
Total Math	30.33	11.35	47.8	-.62	9.76	-.5	43.17	16.24	46.0	-1.39	15.55	-.7	-4.74*	14.51	-2.3
Math Computations	12.70	6.64	49.4	.95	5.82	1.3	16.07	6.07	46.9	-.63	5.67	-.8	-1.08	5.59	-1.4
Math Concepts	17.63	6.31	46.4	-1.57*	5.83	-2.2	15.21	6.84	46.0	-1.40	6.48	-1.8	-2.64*	5.89	[-3.4]

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

Appendix Table I4-31

CHARACTERISTICS OF THE CALIFORNIA PROCESS CHILDREN

		All Groups	Head Start	No Preschool	Some Preschool
NUMBER OF CHILDREN		103	24	21	58
PERCENT OF CHILDREN		100.0	23.3	20.4	56.3
ENTRY AGE IN MONTHS	Mean	65.0	65.5	64.7	64.9
	Standard Deviation	3.5	3.2	3.7	3.6
	Median	65.7	66.0	64.7	65.4
SEX	Percent Female	54.4	50.0	47.6	58.6
FAMILY INCOME ($100)	Mean	44.9	32.6	42.5	48.5
	Standard Deviation	24.4	22.0	25.1	24.5
	Median	42.5	22.5	39.0	50.0
	Percent Missing	52.4	66.7	61.9	43.1
PERCENT FAMILIES WITH INCOMES $\geq$ $9999		0	0	0	0
FAMILY SIZE	Mean	5.4	4.4	5.8	5.6
	Standard Deviation	2.2	1.3	2.7	2.2
	Median	4.9	4.2	5.0	5.5
	Percent Missing	50.5	66.7	57.1	41.4
HIGHEST OCCUPATION IN HOUSE	Mean	13.3	13.4	13.7	13.1
	Standard Deviation	1.7	1.7	2.0	1.6
	Median	12.8	12.8	13.0	12.7
	Percent Missing	55.3	66.7	66.7	46.6
MOTHER'S EDUCATION	Mean	5.4	6.0	5.7	5.2
	Standard Deviation	1.2	.5	.5	1.4
	Median	5.7	6.0	5.8	5.5
	Percent Missing	53.4	66.7	57.1	46.6
CHILDREN'S ETHNICITY	Percent Black	85.4	100.0	81.0	81.0
	Percent White	1.0	0	4.8	0
	Percent Spanish Surname	12.6	0	14.3	17.2
FIRST LANGUAGE	Percent English	86.4	100.0	85.7	81.0
	Percent Spanish	13.6	0	14.3	19.0
PERCENT BILINGUAL CHILDREN		14.6	0	19.0	19.0
KINDERGARTEN WRAT	Mean	36.5	40.0	35.0	35.7
	Standard Deviation	12.3	10.3	14.2	12.2
	Median	36.9	41.5	33.0	35.5
KINDERGARTEN PSI	Mean	19.2	19.8	18.2	19.3
	Standard Deviation	4.9	5.0	5.8	4.5
	Median	19.7	20.0	18.0	20.1

Appendix Table I4-32

PATTERNS FOR THE CALIFORNIA PROCESS CHILDREN
NUMBER AND PERCENT OF CHILDREN WHO DISPLAYED EACH PATTERN OF GAINS

				FIRST GRADE TO THIRD GRADE															
				Head Start				No Preschool				Some Preschool				Overall			
				-	0	+		-	0	+		-	0	+		-	0	+	
KINDERGARTEN TO FIRST GRADE	Reading	N	-	[10]	3	2	[15]	5	3	0	8	[19]	7	5	[31]	[34]	13	7	[54]
		%		[42]	13	8	[62]	24	14	0	38	[33]	12	9	[54]	[33]	12	7	[52]
		N	0	4	0	1	5	5	3	0	8	10	4	7	21	19	7	8	34
		%		17	0	4	21	24	14	0	38	17	7	12	36	18	7	8	33
		N	+	2	1	1	4	0	2	3	5	1	2	3	6	3	5	7	15
		%		8	4	4	17	0	10	14	24	2	3	5	10	3	5	7	15
		N		[16]	4	4	24*	10	8	3	21*	[30]	13	15	58*	[56]	25	22	103*
		%		[66]	17	17	χ^2=16.2	48	38	14	χ^2=10.4	[52]	22	26	χ^2=26.9	[55]	24	21	χ^2=38.8
	Total Math	N	-	5	3	1	9	5	2	[7]	[14]	10	8	[16]	[34]	20	13	[24]	[57]
		%		21	13	4	38	24	10	[33]	[67]	17	14	[28]	[59]	19	12	[23]	[55]
		N	0	5	1	2	8	2	1	1	4	3	8	2	13	10	10	5	25
		%		21	4	8	33	10	5	5	19	5	14	3	22	10	10	5	24
		N	+	[6]	1	0	7	2	0	1	3	4	3	4	11	12	4	5	21
		%		[25]	4	0	29	10	0	5	14	7	5	7	19	12	4	5	21
		N		[16]	5	3	24*	9	3	9	21*	17	19	22	58*	42	27	34	103*
		%		[67]	21	12	χ^2=11.4	43	14	43	χ^2=14.3	29	33	38	χ^2=20.7	41	26	33	χ^2=26.3
	Math Computations	N	-	4	2	2	8	3	4	0	7	5	11	8	24	[12]	[17]	[10]	[39]
		%		17	8	8	33	14	19	0	33	9	19	14	41	[12]	[16]	[10]	[38]
		N	0	2	1	0	3	1	3	5	9	4	2	8	14	7	6	13	26
		%		8	4	0	13	5	14	24	43	7	3	14	24	7	6	12	25
		N	+	[10]	0	3	[13]	2	3	0	5	5	9	6	20	[17]	[12]	9	38
		%		[42]	0	13	[54]	10	14	0	24	9	16	10	35	[16]	[12]	9	37
		N		[16]	3	5	24*	6	10	5	21*	14	22	22	58*	[36]	[35]	[32]	103*
		%		[67]	12	21	χ^2=18.1	28	48	24	χ^2=11.7	24	38	38	χ^2=9.3	[35]	[34]	[31]	χ^2=7.7
	Math Concepts	N	-	[7]	4	3	[14]	[7]	4	[6]	[17]	13	12	11	[36]	[27]	[20]	[20]	[67]
		%		[29]	17	13	[58]	[33]	19	[29]	[81]	22	21	19	[62]	[26]	[19]	[19]	[65]
		N	0	5	0	1	6	1	1	2	4	6	4	3	13	12	5	6	23
		%		21	0	4	25	5	5	10	19	10	7	5	22	12	5	6	22
		N	+	4	0	0	4	0	0	0	0	3	3	3	9	7	3	3	13
		%		17	0	0	17	0	0	0	0	5	5	5	16	7	3	3	13
		N		[16]	4	4	24*	8	5	8	21*	22	19	17	58*	[46]	28	29	103*
		%		[66]	17	17	χ^2=16.1	38	24	38	χ^2=21.5	38	33	29	χ^2=17.2	[45]	27	28	χ^2=43.2

Note. -- * indicates a χ^2 with $p \leq .1$.

[ ] indicates that a significant number of children displayed the pattern.

Appendix Table I4-33

MEANS AND STANDARD DEVIATIONS AND STANDARDIZED SCORES
FOR FIRST GRADE AND THIRD GRADE FOR CAL PROCESS CHILDREN

	FIRST GRADE						THIRD GRADE								
	Raw Score			Kindergarten to First Grade Residual			Raw Score			First Grade to Third Grade Residual			Kindergarten to Third Grade Residual		
	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	T Score	Mean	S.D.	Stand. Score	Mean	S.D.	Stand. Score
HEAD START (N = 24)															
Reading	39.12	14.58	47.0	-7.80*	11.44	[-3.9]	35.87	16.07	43.9	-8.38*	11.58	[-4.5]	-16.24*	14.94	[-8.7]
Total Math	30.33	11.80	47.8	-1.56	9.87	-1.2	39.83	17.95	44.4	-10.11*	14.41	[-4.9]	-15.36*	15.38	[-7.5]
Math Computations	12.29	6.64	48.8	1.54	6.38	2.2	15.41	6.25	46.0	-2.44*	4.88	[-3.2]	-4.62*	5.17	[-6.0]
Math Concepts	18.04	6.14	47.0	-3.11*	4.62	[-4.5]	13.54	6.72	43.8	-5.51*	5.77	[-7.1]	-6.10*	6.01	[-7.8]
NO PRESCHOOL (N = 21)															
Reading	43.19	18.60	49.0	-.40	11.98	-.2	38.85	18.79	45.5	-3.61	11.45	-1.9	-9.04*	13.38	[-4.8]
Total Math	28.52	14.47	46.4	-5.89*	9.11	[-4.6]	44.23	19.23	46.6	-.58	12.57	-.3	-8.61*	13.01	[-4.2]
Math Computations	12.28	7.69	48.8	-.49	5.55	-.7	16.57	6.47	47.5	-.03	4.06	0.0	-2.57*	4.75	[-3.4]
Math Concepts	16.23	7.80	44.4	-5.39*	5.13	[-7.7]	15.90	8.17	46.8	-.67	5.77	-.9	-3.17*	6.03	[-4.1]
SOME PRESCHOOL (N = 58)															
Reading	35.72	22.71	45.3	-9.19*	20.49	[-4.5]	36.84	16.20	44.4	-1.29	13.95	-.7	-8.24*	13.02	[-4.4]
Total Math	28.69	10.25	46.5	-4.73*	8.82	[-3.7]	43.65	16.85	46.3	2.44	13.88	1.2	-5.45*	14.75	[-2.7]
Math Computations	11.86	5.35	48.2	-.82	4.82	-1.1	16.60	6.65	47.5	1.28	6.02	1.7	-.85	6.14	-1.1
Math Concepts	16.82	6.38	45.3	-3.91*	5.53	[-5.6]	14.91	6.84	45.6	-.25	5.77	-.3	-3.23*	6.34	[-4.1]

Note. -- T scores and standard scores were computed with the overall NFT mean and standard deviation for the particular measures. See Table D3-13 for values. The T score computation was:

$$T = \frac{\text{(raw score mean - NFT mean)}}{\text{NFT S.D.}} \times 10 + 50.$$

The standard score for residuals was: $S.S. = \frac{\text{FT residual mean}}{\text{NFT raw score S.D.}} \times 10$. These computations convert the raw scores and residuals scores to a common metric for comparison purposes.

* indicates a residual which is different from zero ($p \leq .05$).

[ ] indicates a residual which is different from zero and as large as or larger than one-quarter of a standard deviation of the outcome.

PART I
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PART II

STUDY OF FOLLOW THROUGH CHILDREN AT ACADEMIC RISK

INTRODUCTION

During the 1960s evaluators and policymakers became aware that large numbers of minority children and other poor children were not maintaining a learning pace comparable to that of their more advantaged peers. A number of educational intervention programs such as Head Start and Title I were inaugurated with the hope that massive remedial compensatory education for such children would mitigate the early effects of living in disadvantaged environments, and enable them to catch up with more advantaged children. The Follow Through "experiment" is one of these educational intervention projects. Follow Through was designed after it was suspected that academic gains made during compensatory preschool programs were not maintained as children progressed through elementary school, and that the gap between the level of academic performance of advantaged and disadvantaged children widened as children progressed through the public educational system.

The results of the national evaluation of Follow Through indicate that, with few exceptions, the Follow Through sponsors have failed to diminish the usual relationship between disadvantaged status and academic underachievement for the broad spectrum of children enrolled. Rather, the results suggest that some programs are effective for some children under some conditions (e.g., different kinds of children in different locations). This is not surprising when we consider that the children enrolled in the various Follow Through programs do not constitute a homogeneous group. They differ in degree and kind of disadvantage. That is, relative to their peers in the FT and NFT groups, they may be highly disadvantaged with regard to some factors which are related to achievement in school and much less disadvantaged with regard to others. For example, the Follow Through children differ in their levels of socioeconomic disadvantage, in the extent to which their communities and home environments foster motivation for educational attainment, and in the amount and kind of educational resources available in their homes.

Further, when children enter school they vary with regard to the amount of prior exposure they have had to the concepts, skills, and learning experiences stressed in school.

Just as the children enrolled in the Follow Through program differ with regard to their levels of disadvantage on a number of factors which are related to school achievement, the Follow Through sponsors represent a number of different educational philosophies and approaches. Some sponsors emphasize open, child-centered classrooms while others utilize more structured, teacher-centered classrooms. While all sponsors share the goal of students acquiring basic academic skills, some see acquisition of these skills as the main focus of their projects while others believe that social and emotional development must precede basic skill acquisition. Some sponsors are primarily concerned with the educational environment in the home and provide specific training for parents so that they may teach their children at home and reinforce classroom learning; other sponsors believe that simply involving parents in decision making will produce effects which will eventually influence children's learning. These different approaches to education and parent involvement, to the extent that they have been implemented as sponsors intended, may have different consequences for children with different levels of disadvantage.

This study is exploratory and descriptive. Its purpose is to determine whether Follow Through and individual Follow Through sponsors diminish the usual relationship between disadvantaged status and poor school achievement. The study examines patterns of academic achievement over four years for Follow Through and non-Follow Through children who at entry to kindergarten were the least and the most disadvantaged within their respective groups on several variables which are generally correlated with academic achievement.

In this study, four variables serve as indicators of economic, home environmental, experiential, and psychosocial disadvantage or risk. These variables, which were assessed when the children entered kindergarten, are:

- Family income, which serves as an indicator of economic disadvantage, and is related to the resources in a home and the kinds of opportunities and experiences available to a child;

- Educational level attained by the head of the household, which serves as an indicator of the educational and intellectual environment in the home, may be related to the level of cognitive and intellectual stimulation, the value placed on educational attainment in the home, and the parents' ability to assist the children in attaining educational goals;
- Peabody Picture Vocabulary Test scores at the beginning of kindergarten, which serves as an indicator of the child's achievement and knwoledge of concepts and vocabulary which are needed in school;
- Parents' scores on a locus of control scale, which assesses respondents' perceptions of the amount of control they exert over their own fates, and serves as the indicator of the psychosocial home environment.

Children who are highly disadvantaged with regard to their status on these variables are considered to be at high risk of academic underachievement, and children who are the least disadvantaged with regard to their status on these variables are considered to be at low risk of academic underachievement.

The specific criteria for establishing membership in high and low risk groups for each indicator are presented in Table II-1. Metropolitan Achievement Test (MAT) reading and mathematics scores for children classified as high or low risk according to each of the four indicators are traced separately over four years for the Follow Through versus the non-Follow Through group, overall and for each sponsor. The questions which guided the exploration of data in this study were:

- Are the patterns of achievement across grades different for Follow Through versus non-Follow Through children at high and low academic risk?
- Are there differences in individual sponsors' patterns of outcomes for children at high versus low academic risk?
- Are patterns of achievement outcomes different for the four risk indicators?

Approach to Analysis

The basic purpose of this study is descriptive, that is, the study attempts to characterize the performance of several extreme groups, e.g., the high income groups, the groups with low scores on the PPVT, etc., in order to determine whether Follow Through or an individual sponsor has altered the traditional pattern of progress for the children in these

Table II-1

CRITERIA FOR ESTABLISHING HIGH AND LOW ACADEMIC RISK GROUPS

Indicators of Academic Risk	Criteria	
	High Academic Risk	Low Academic Risk
Socioeconomic Indicators Family Income	Family income less than $3800	Family income equal to or greater than $9999
Head of Household's Education	Education less than high school completed	Some college
Home/Psychosocial Environment Parent locus or Sense of Personal Efficacy	Lowest third of the combined FT and NFT distribution (External locus or low sense of personal efficacy)	Upper third of the combined FT and NFT distribution (Internal locus or high sense of personal efficacy
Academic Entry Test Peabody Picture Vocabulary Test	Lowest third of combined FT and NFT distribution	Highest third of combined FT and NFT distribution

extreme categories. The performance of the NFT children is utilized as a standard against which to judge the performance of Follow Through children. Since the criteria for inclusion in a given category were applied uniformly to both FT and NFT children, the FT and NFT children in a given category have similar characteristics although the groups are not equivalent. Note is made of important differences between the groups in the sample descriptions.

The measures include reading and mathematics scores on the Wide Range Achievement Test (WRAT) in the fall and spring of kindergarten, and reading and mathematics scores on the Metropolitan Achievement Test (MAT) in the spring of kindergarten, first grade, second grade, and third grade. Median scores for the FT and NFT groups, the percent of FT children who score above the NFT median, as well as the grade equivalents for the publishers standardized scores are presented for the end of the third grade when any cumulative effects of programs should be apparent.

Comparison of the FT and NFT groups utilizes the proportion of FT children who score at or above the NFT median. If this percentage ranges from 40 percent to 60 percent, the groups are similar; if the percentage is as low or lower than 30 percent or as high or higher than 70 percent, the Follow Through and non-Follow Through groups are substantially different. Admittedly these values are arbitrary; however, they do aid in the identification of outlying groups.

Just as the similarity or difference between a FT and NFT group can be assessed by reference to the proportion of FT children who score at or above the NFT median, this kind of simple decision rule also provides a device for describing the progress of FT children relative to NFT across grades. For example, a change of 15 percent or larger may indicate a change in status, either to a more or less favorable position. For example, if only 30 percent of the FT children achieved scores at or above the NFT median at entry to kindergarten, but at the end of third grade 50 percent of the FT group scored at or above the NFT median, the FT group has improved its position relative to NFT.

Grade equivalent scores indicate the grade placement of the average or typical pupil. If the Low Risk NFT children receive scores which are typical of children in the ninth month of the third grade, and the Low Risk FT children receive scores typical of children in the first month of the second grade, then the performance of the two groups differs substantially.

These simple, easily interpreted statistics are utilized rather than means, standard deviations and t tests since the study is concerned with description and is not concerned with a rigorous assessment of differences.

Presentation of Results

Graphs display median test scores on the reading and mathematics subtests of the WRAT for the fall and spring of kindergarten and for the MAT at four time points: spring kindergarten, first, second and third grades. Though the scales for the WRAT and MAT have equal-sized intervals, it should be remembered that the WRAT scale is in raw score units, while the MAT scale utilizes the publisher's standard scores. No linkages of absolute level can be made between the two scales.

The table at the bottom of each graph gives the medians which are plotted and the sample size for each time point. Children included had to have at least the fall kindergarten WRAT and the third grade MAT. Interim test scores were optional and test scores for the interim time points are missing for some children. When a sponsor has fewer than 30 children tested at the first and last time points, no graph is presented. When a sponsor's group includes fewer than 30 children for an interim time point, a note is included.

The number in the third row of each cell (see Table II-4) represents, for that time point and risk category, the percentage of FT children scoring at or above the NFT median. The grade equivalents of the standard scores are indicated along the left hand margin of each graph. Tables that present relevant background information for children in the pooled NFT group and each sponsor's FT group are also presented and serve to determine differences between the FT and NFT groups within a given risk dimension that might be related to disadvantaged status and school performance.

In the sections that follow, outcomes are discussed separately for each of the four risk indicators.

PATTERNS OF OUTCOMES FOR THE FAMILY INCOME INDICATOR OF ACADEMIC RISK

As Tables II-2 and II-3 indicate, the children classified as Low Risk (high Income) are more advantaged than the High Risk (low Income) children on all variables presented. That is, Low risk heads of households have higher occupational status than the High Risk group (e.g., "sales" vs.

Table II-2

BACKGROUND CHARACTERISTICS OF CHILDREN
IN THE LOW INCOME - HIGH RISK CATEGORY

	NON-FOLLOW THROUGH	FOLLOW THROUGH	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	ILLP	SEDL	CAL PROCESS	
Number of Children	538	936	85	65	55	87	180	89	75	68	56	127	49	
Head of Household's Occupation														
Mean	13.00	12.99	12.77	12.94	13.40	13.23	12.71	13.02	13.02	13.26	12.93	13.05	13.17	
Standard Deviation	1.78	1.78	1.87	1.59	1.57	1.85	1.42	1.73	1.79	1.56	1.81	2.30	1.67	
Median	12.69	12.59	12.27	12.74	12.98	12.84	12.44	12.44	12.40	12.90	12.39	12.79	12.55	
Mother's Education														
Mean	4.97	5.10	5.18	5.01	5.40	5.29	5.08	5.21	5.40	5.21	5.65	4.08	5.56	
Standard Deviation	1.14	1.11	.85	1.25	.90	.86	.90	1.07	.84	.72	.72	1.47	1.10	
Median	5.09	5.21	5.18	5.27	5.45	5.33	5.13	5.21	5.43	5.20	5.74	4.13	5.73	
Sex														
Percent Female	53.9	52.1	49.4	52.3	52.7	52.9	53.3	49.4	46.7	57.4	48.2	55.9	51.0	
Children's Ethnicity														
Percent Black	63.0	67.5	50.6	69.2	69.1	75.9	92.2	85.4	58.7	79.4	53.6	24.4	79.6	
Percent White	23.6	18.3	40.0	20.0	30.9	24.1	3.9	5.6	29.3	20.6	46.4	9.4	0.0	
Percent Spanish Speaking	13.4	14.2	9.4	10.8	0.0	0.0	3.9	9.0	12.0	0.0	0.0	66.1	20.4	
First Language														
Percent English	91.1	88.2	95.3	90.8	98.2	100.0	96.1	95.5	92.2	100.0	100.0	43.3	79.6	
Percent Spanish	8.7	11.6	4.7	9.2	0.0	0.0	3.9	4.5	8.0	0.0	0.0	56.7	20.4	
Preschool Experience														
Percent Head Start	31.2	55.8	62.4	73.8	34.5	63.2	56.1	65.2	50.7	39.7	71.4	52.0	34.7	
Percent Some Preschool	27.3	27.2	32.9	15.4	47.3	27.6	23.3	20.2	29.3	45.6	7.1	17.3	57.1	
Percent No Preschool	41.4	17.0	4.7	10.8	18.2	9.2	20.6	14.6	20.0	14.7	21.4	30.7	8.2	

Table II-3

BACKGROUND CHARACTERISTICS OF CHILDREN
IN THE HIGH INCOME - LOW RISK CATEGORY

	NON-FOLLOW THROUGH	FOLLOW THROUGH	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	ILS	SEDL	CAL PROCESS
Number of Children	395	199	17	26	14	3	25	12	26	24	36	12	4
Head of Household's Occupation													
Mean	15.31	14.76	14.18	14.44	16.00	13.33	14.24	13.92	14.04	14.63	16.17	15.00	13.75
Standard Deviation	2.59	2.50	2.37	2.36	2.80	.58	2.45	2.01	2.76	2.68	1.96	2.52	1.70
Median	14.41	14.11	13.38	14.00	15.00	13.25	13.82	13.75	13.50	13.75	16.63	14.17	13.50
Mother's Education													
Mean	6.15	6.03	5.94	6.04	6.14	5.33	6.36	5.91	5.88	5.73	6.47	5.58	5.00
Standard Deviation	1.06	1.12	.96	.88	1.29	.57	1.21	.79	1.42	.96	.87	1.62	.81
Median	6.08	6.04	6.00	6.04	6.16	5.25	6.37	6.00	5.87	5.84	6.27	5.83	5.00
Sex													
Percent Female	48.9	52.8	35.3	53.8	57.1	33.3	68.0	50.0	57.7	62.5	44.4	41.7	50.0
Children's Ethnicity													
Percent Black	21.8	35.7	41.2	26.9	35.7	66.7	60.0	66.7	26.9	50.0	2.8	25.0	100.0
Percent White	75.2	62.3	58.8	73.1	64.3	33.3	36.0	33.0	69.2	50.0	97.2	58.3	0.0
Percent Spanish Speaking	3.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0
First Language													
Percent English	97.0	99.0	100.0	100.0	92.9	100.0	100.0	100.0	96.2	100.0	100.0	100.0	100.0
Percent Spanish	2.5	.5	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0
Preschool Experience													
Percent Head Start	7.3	18.6	35.3	11.5	14.3	66.7	28.0	50.0	7.7	12.5	8.3	33.3	25.0
Percent Some Preschool	34.9	41.7	58.8	26.9	64.3	0.0	24.0	41.7	46.2	41.7	47.2	25.0	50.0
Percent No Preschool	57.7	39.7	5.9	61.5	21.4	33.3	48.0	8.3	46.2	45.8	44.4	41.7	25.0

"operatives" positions). Mothers of Low Risk children have, on the average, completed high school whereas mothers of High Risk children have not. The ethnic composition of the Low Risk group is predominantly White whereas the High Risk group is predominantly Black.

Within the High and Low Risk groups, the FT and NFT children are relatively homogeneous with regard to pertinent background characteristics although both of the FT groups have a higher percentage of Black children and a higher percentage of Head Start graduates. That is, we find a great deal of difference between High and Low Risk groups on background characteristics; however, within the risk categories, children are comparable.

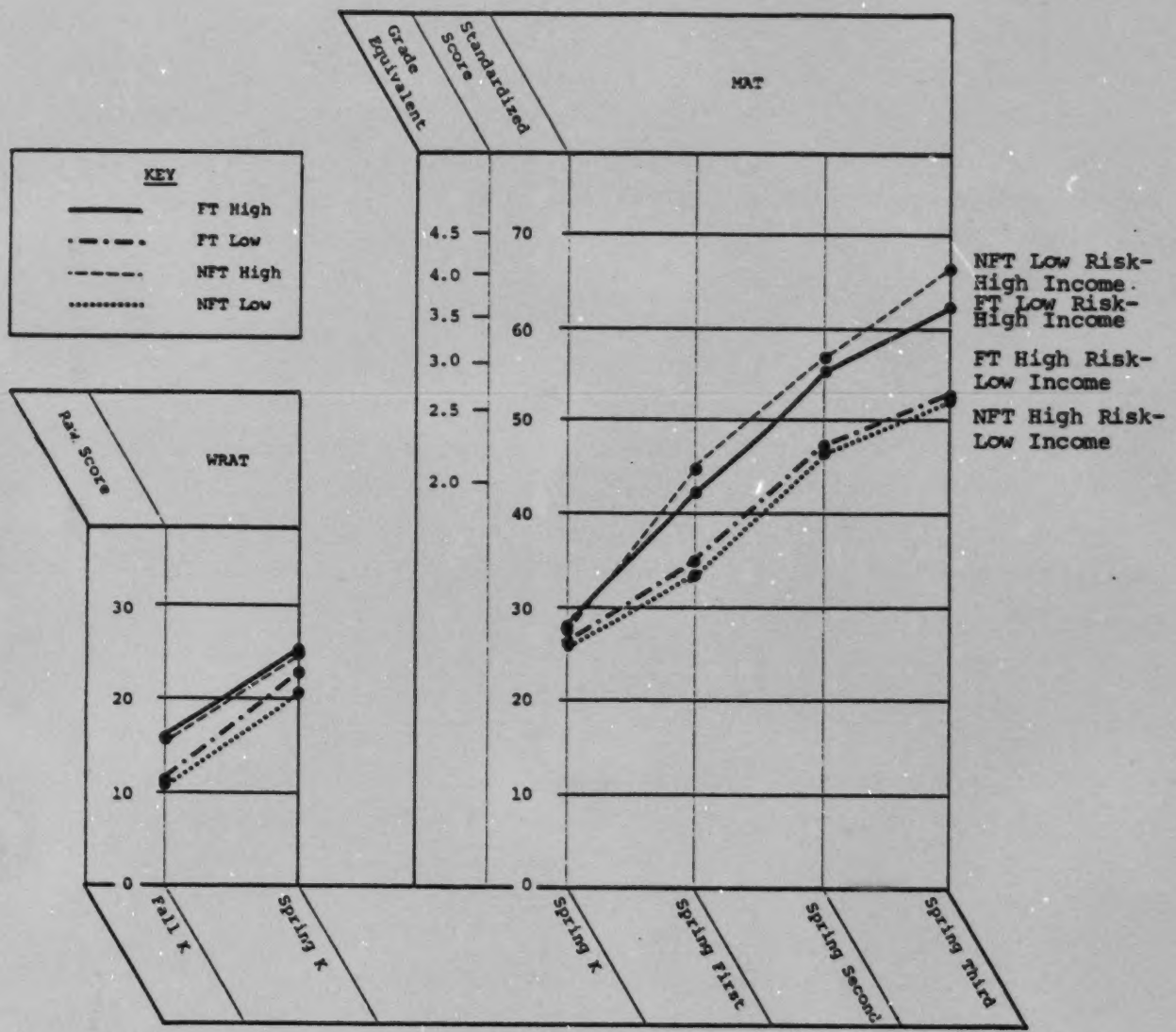
Results

At entry to kindergarten and throughout the early school grades Follow Through and non-Follow Through children classified as Low Risk (high Income) scored higher on both the reading and mathematics tests than High Risk children. (See Table II-4 and II-5.) The distributions of the reading and mathematics scores of the FT and NFT High Risk groups are similar, but the scores of the Low Risk NFT group are somewhat higher than those of the Low Risk FT group. At the end of third grade 50 percent of the High Risk FT children scored at or above the NFT median on the MAT reading test, and 53 percent scored at or above the NFT median on the MAT mathematics test. However, at the end of the third grade only 38 percent of the Low Risk children scored at or above the NFT median on the MAT reading test and 42 percent scored at or above the NFT level on the MAT mathematics test.

There are too few children in individual sponsor's Low Risk groups for meaningful comparisons. (See Tables II-6 and II-7.) In general, the reading and mathematics scores of the sponsor's High Risk children do not differ from those of the NFT group (Tables II-8 and II-9). Furthermore, the relative status of most groups, as indicated by the percentage of FT children who score above the NFT median, remains more or less constant across the four year period. However, there are some exceptions to this general pattern. The reading scores of children in the Direct Instruction program show a slightly more favorable position relative to NFT at the end of the program. At entry to kindergarten 58 percent of the Direct Instruction children scored at or above the NFT median whereas at the end of third grade 72 percent score at or above the NFT median. The Cognitive Curriculum also shows a dramatic drop in math scores and perhaps a recovery. At entry

Table II-4

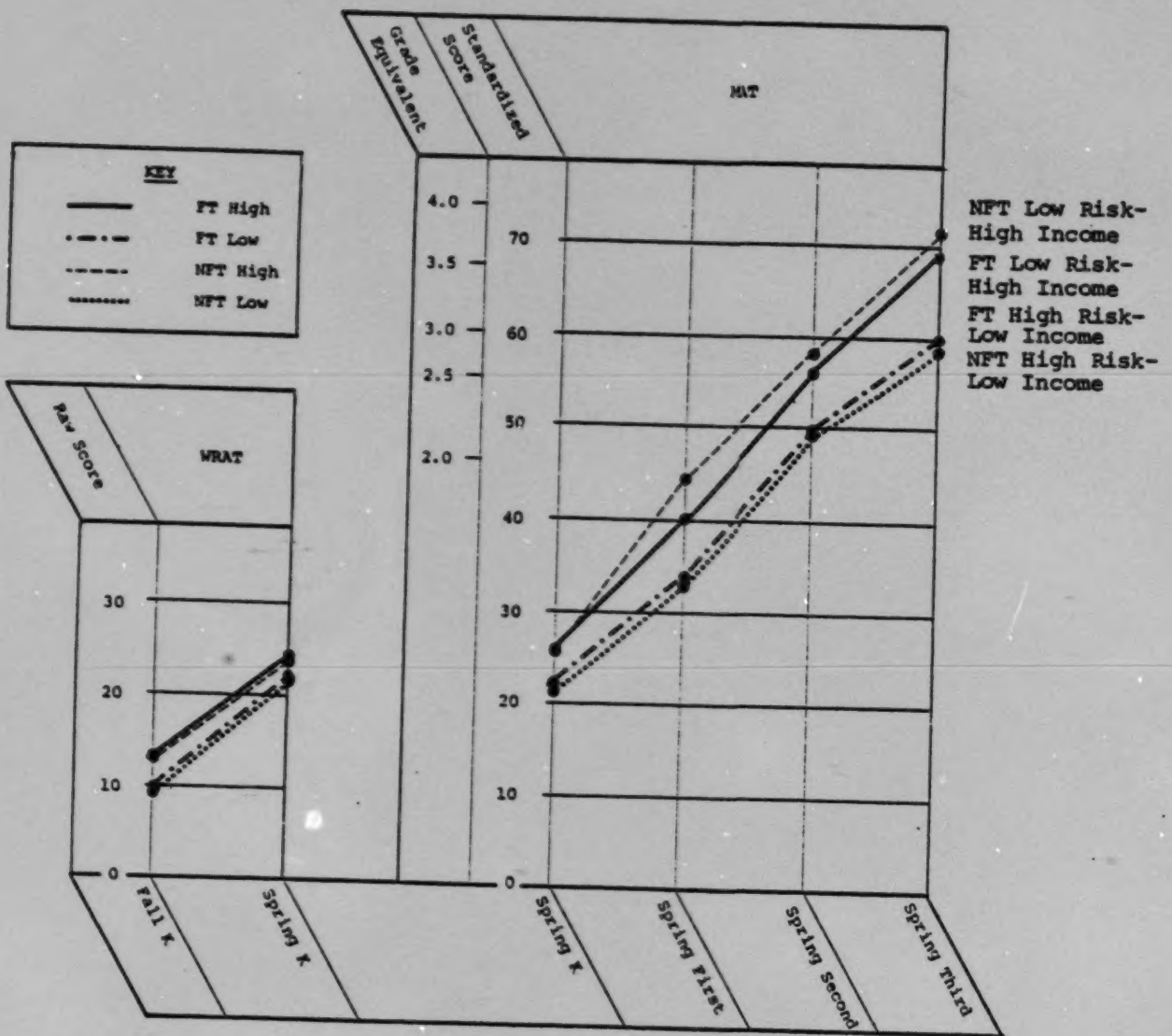
LONGITUDINAL PROFILE OF POOLED SPONSORS' AND POOLED NFT CHILDREN'S READING SCORES FOR THE FAMILY INCOME RISK DIMENSION



	Fall Kindergarten WRAT		Spring Kindergarten WRAT		Spring Kindergarten MAT		Spring First Grade MAT		Spring Second Grade MAT		Spring Third Grade MAT	
	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT
High Income Median	15.6	15.7	25.1	24.8	27.7	27.4	42.2	44.3	55.3	56.6	62.6	66.6
N	199	395	177	277	172	221	93	191	158	263	199	395
Percent ≥ NFT Median	52		62		55		41		45		38	
Low Income Median	11.2	10.7	23.2	20.5	26.3	25.9	34.6	33.3	47.1	46.5	52.4	52.0
N	936	538	722	295	705	278	486	231	644	307	936	538
Percent ≥ NFT Median	57		64		64		52		54		50	

Table II- 5

LONGITUDINAL PROFILE OF POOLED SPONSORS' AND POOLED NFT CHILDREN'S MATHEMATICS SCORES FOR THE FAMILY INCOME RISK DIMENSION



	Fall Kindergarten WRAT		Spring Kindergarten WRAT		Spring Kindergarten MAT		Spring First Grade MAT		Spring Second Grade MAT		Spring Third Grade MAT	
	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT
High Income Median	13.2	13.0	24.2	23.7	25.4	25.3	40.2	44.0	56.0	57.7	68.6	71.7
N	199	395	177	227	171	222	89	181	152	253	199	395
Percent ≥ NFT Median	48		63		50		45		43		42	
Low Income Median	9.8	9.4	22.2	21.6	22.3	21.4	33.7	32.7	49.6	49.1	59.9	58.7
N	936	538	722	295	707	285	458	212	615	299	986	538
Percent ≥ NFT Median	53		59		57		58		51		53	

Table II-6

LONGITUDINAL PROFILE OF SPONSORS' LOW RISK-HIGH INCOME CHILDREN'S READING SCORES

	OVERALL NFT	OVERALL FT**
FALL KINDERGARTEN WRAT*		
Median	15.7	15.8
N	395	199
Percent ≥ NFT Median	--	52
SPRING KINDERGARTEN WRAT		
Median	24.8	25.1
N	227	177
Percent ≥ NFT Median	--	62
SPRING KINDERGARTEN MAT*		
Median	27.4	27.7
N	221	172
Percent ≥ NFT Median	--	55
SPRING FIRST GRADE MAT		
Median	44.3	42.2
N	191	93
Percent ≥ NFT Median	--	41
SPRING SECOND GRADE MAT		
Median	56.3	55.3
N	263	158
Percent ≥ NFT Median	--	45
SPRING THIRD GRADE MAT		
Median	66.6	62.6
N	395	199
Percent ≥ NFT Median	--	38

* WRAT scores are raw scores; MAT scores are publisher's standard scores.

** There were not enough cases to permit sponsor comparisons of high income children.

Table II-7

LONGITUDINAL PROFILE OF SPONSORS' LOW RISK-HIGH INCOME CHILDREN'S MATHEMATICS SCORES

	OVERALL NFT	OVERALL FT
FALL KINDERGARTEN WRAT*		
Median	13.0	13.2
N	395	199
Percent ≥ NFT Median	--	48
SPRING KINDERGARTEN WRAT		
Median	23.7	24.2
N	227	177
Percent ≥ NFT Median	--	63
SPRING KINDERGARTEN MAT*		
Median	25.3	25.4
N	222	171
Percent ≥ NFT Median	--	57
SPRING FIRST GRADE MAT		
Median	44.0	40.2
N	181	89
Percent ≥ NFT Median	--	45
SPRING SECOND GRADE MAT		
Median	57.7	56.0
N	253	152
Percent ≥ NFT Median	--	43
SPRING THIRD GRADE MAT		
Median	71.7	68.6
N	395	199
Percent ≥ NFT Median	--	42

* WRAT scores are raw scores; MAT scores are publisher's standard scores.

** There were not enough cases to permit sponsor comparisons of high income children.

Table II-8

LONGITUDINAL PROFILE OF SPONSORS' HIGH RISK-LOW INCOME CHILDREN'S READING SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
FALL KINDERGARTEN WRAT*													
Median	10.7	11.2	11.1	10.9	14.6	11.6	11.5	10.3	12.1	12.2	11.8	9.6	15.2
N	538	936	85	65	55	87	180	89	75	68	56	127	49
Percent ≥ NFT Median	--	57	55	54	71	61	59	47	67	65	68	37	67
SPRING KINDERGARTEN WRAT													
Median	20.5	23.2	23.6	22.0	24.6	24.5	24.3	21.0	24.0	23.0	23.8	18.0	--
N	295	722	79	60	51	64	152	85	72	50	55	54	--
Percent ≥ NFT Median	--	64	70	55	73	66	70	55	65	64	69	41	--
SPRING KINDERGARTEN MAT*													
Median	25.9	26.3	26.0	25.9	26.2	28.3	27.2	25.7	26.2	26.4	26.4	24.8	--
N	278	708	77	61	49	65	152	81	68	51	55	49	--
Percent ≥ NFT Median	--	64	60	57	68	78	77	56	57	61	65	37	--
SPRING FIRST GRADE MAT													
Median	33.3	34.6	31.2	36.2	40.0	41.0	36.5	28.6	36.5	37.5	41.0	32.3	32.5
N	231	486	46	29	21	54	100	54	46	38	13	61	24
Percent ≥ NFT Median	--	52	37	59	72	74	60	24	57	61	69	43	38
SPRING SECOND GRADE MAT													
Median	46.4	47.1	47.2	46.0	51.5	51.7	47.1	45.0	48.0	46.7	47.1	44.5	--
N	307	644	64	58	46	66	140	78	58	49	51	34	--
Percent ≥ NFT Median	--	54	53	48	65	70	55	37	55	53	57	50	--
SPRING THIRD GRADE MAT													
Median	52.0	52.4	51.0	52.0	55.0	56.4	53.6	47.6	54.2	50.5	57.0	49.0	50.0
N	538	936	85	65	55	87	180	89	75	68	56	127	49
Percent ≥ NFT Median	--	50	49	52	60	68	57	35	61	43	66	39	41

*WRAT scores are raw scores; MAT scores are publisher's standard scores.

Table II-9

LONGITUDINAL PROFILE OF SPONSORS' HIGH RISK-LOW INCOME CHILDREN'S MATHEMATICS SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
FALL KINDERGARTEN WRAT*													
Median	9.4	9.8	9.6	8.9	10.6	10.4	10.4	10.0	12.2	9.8	9.8	7.0	12.6
N	538	936	85	65	55	87	180	89	75	68	56	127	49
Percent ≥ NFT Median	--	53	51	45	59	58	58	57	65	52	52	31	67
SPRING KINDERGARTEN WRAT													
Median	21.6	22.2	21.8	21.0	21.9	24.0	23.4	21.7	22.7	21.7	23.3	19.2	--
N	295	722	79	60	51	64	152	85	72	50	55	54	--
Percent ≥ NFT Median	--	59	53	40	61	75	69	54	64	54	76	24	--
SPRING KINDERGARTEN MAT*													
Median	21.4	22.3	21.6	20.6	21.1	26.1	25.8	21.6	22.8	21.0	22.8	19.7	--
N	285	707	79	60	51	65	151	80	72	49	55	52	--
Percent ≥ NFT Median	--	57	53	37	61	74	76	51	64	45	60	31	--
SPRING FIRST GRADE MAT													
Median	32.7	33.7	32.9	33.0	32.0	33.5	37.4	28.1	36.2	36.3	36.0	31.7	31.8
N	212	458	43	27	17	50	95	49	44	38	12	60	23
Percent ≥ NFT Median	--	58	56	56	42	56	72	27	73	87	67	43	44
SPRING SECOND GRADE MAT													
Median	49.1	49.6	49.0	49.2	48.3	51.2	51.1	40.7	50.0	51.1	50.0	48.5	--
N	299	615	64	57	37	61	128	75	58	48	53	34	--
Percent ≥ NFT Median	--	51	48	47	46	61	62	27	52	60	53	44	--
SPRING THIRD GRADE MAT													
Median	58.7	59.9	57.9	61.2	58.2	64.8	61.5	53.3	60.8	58.3	59.5	58.4	57.6
N	538	936	85	65	55	87	180	89	75	68	56	127	49
Percent ≥ NFT Median	--	53	47	57	49	72	59	40	56	49	53	50	43

*WRAT scores are raw scores; MAT scores are publisher's standard scores.

to school 57 percent of the Cognitive Curriculum children scored above the NFT median. During second and third grade the percentage falls to a low of only 27. However, at the end of third grade 40 percent of the Cognitive Curriculum children scored at or above the NFT median. The children in the EDC program appear to drop across the four year period. At kindergarten entry 65 percent of the EDC children score higher in reading than the NFT median while at exit from third grade only 43 percent of the children scored at or above this value. The Cal Process children show a similar drop in reading and mathematics from 67 percent above the NFT medians at entry to kindergarten to only 41 and 43 percent respectively at the end of third grade. Finally, the SEDL children show substantial progress. At entry to school, only 31 percent of the predominantly Spanish children scored at or above the NFT median while at the end of third grade 50 percent achieve such scores. These results indicate that for FT in general, income is strongly related to academic achievement, and that the expected relationship between income and scores on standardized achievement tests has not been materially disrupted for most sponsors.

PATTERNS OF OUTCOMES FOR THE HEAD OF HOUSEHOLD EDUCATION RISK INDICATOR

In general the level of formal education attained by parents is related positively to children's academic performance. The number of years of formal schooling of the parents is related to the type and complexity of language used in the home (Hess and Shipman, 1967; Bee, et al., 1969), to parents' system awareness or ability to use and manipulate institutions (Tomlinson, 1973), and to parents' ability to help their children with academic work (Ogbu, 1974). All of these variables in turn are related to academic achievement. In this study, if the head of the household reported some college education, the child was assigned to a Low Risk category, and if the head of household had not completed high school, the child was assigned to the High Risk category.

Sample Descriptions of Education Risk Groups

The children classified as Low Risk (high education) are considerably more advantaged than those classified as High Risk (low education) on all of the pertinent background variables. (See Tables II-10 and II-11.) Both the FT and NFT Low Risk groups have a considerable income advantage over the High Risk groups. Likewise, the occupational levels are higher

Table II-10

BACKGROUND CHARACTERISTICS OF CHILDREN
IN THE LOW ECUCATION - HIGH RISK CATEGORY

	NON-FOLLOW THROUGH	FOLLOW THROUGH	RESPONSIVE EDUCATION	TEEN	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	ILLP	SEDL	CAL PROCESS
Number of Children	413	490	33	48	31	26	70	35	32	43	16	134	22
Family Income in Dollars													
Mean	5056.	4453.	3518.	4875.	5403.	4450.	4310.	4157.	4300.	5728.	5744.	3730.	5723.
Standard Deviation	2722.	2413.	1516.	2147.	2495.	2641.	2637.	2395.	2191.	2834.	2816.	1983.	2390.
Median	4495.	4150.	2592.	4700.	5266.	3350.	3800.	3725.	4200.	5250.	4800.	3233.	5667.
Head of Household's Occupation													
Mean	12.81	12.69	12.19	13.08	12.75	12.69	12.58	12.23	12.84	12.52	14.60	12.69	12.58
Standard Deviation	1.76	1.67	1.53	1.43	1.34	0.89	1.28	1.08	1.55	1.21	2.38	2.13	1.36
Median	12.85	12.77	12.28	13.12	12.93	12.78	12.77	12.34	12.88	12.68	13.32	12.74	12.80
Mother's Education													
Mean	4.24	4.22	4.24	4.34	4.51	4.20	4.34	4.36	4.64	4.65	5.71	3.63	4.33
Standard Deviation	1.31	1.34	1.09	1.44	1.18	0.83	1.23	1.34	1.26	0.89	0199	1.43	1.49
Median	4.29	4.28	4.33	4.60	4.55	4.11	4.43	4.27	4.60	4.73	5.87	3.53	4.75
Sex													
Percent Female	49.9	55.3	63.6	54.2	58.1	65.4	57.1	45.7	50.0	55.8	37.5	54.5	63.6
Children's Ethnicity													
Percent Black	40.4	49.4	33.3	43.8	48.4	88.5	75.7	74.3	43.8	76.7	25.0	23.1	50.0
Percent White	33.9	20.8	33.3	27.1	51.6	11.5	15.7	2.9	31.3	23.3	75.0	11.2	0.0
Percent Spanish Speaking	25.7	29.8	33.3	29.2	0.0	0.0	8.6	22.9	25.0	0.0	0.0	65.7	50.0
First Language													
Percent English	78.0	74.3	81.8	72.9	83.9	100.0	92.9	85.7	78.1	100.0	100.0	44.8	50.0
Percent Spanish	17.7	24.5	18.2	27.1	0.0	0.0	7.1	14.3	21.9	0.0	0.0	54.5	50.0
Preschool Experience													
Percent Head Start	27.1	50.6	60.6	66.7	29.0	61.5	60.0	57.1	31.3	34.9	62.5	51.5	22.7
Percent Some Preschool	19.6	25.7	27.3	14.6	45.2	38.5	15.7	25.7	21.9	41.9	0.0	19.4	68.2
Percent No Preschool	53.3	23.7	12.1	18.8	25.8	0.0	24.3	17.1	46.9	23.3	37.5	29.1	9.1

Table II-11

BACKGROUND CHARACTERISTICS OF CHILDREN
IN THE HIGH EDUCATION - LOW RISK CATEGORY

	NON-FOLLOW THROUGH	FOLLOW THROUGH	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
Number of Children	336	217	24	22	20	10	19	20	18	15	28	22	19
Family Income in Dollars													
Mean	8138.	6651.	6725.	8009.	7545.	3580.	7894.	4225.	7166.	7913.	7860.	6141.	4205.
Standard Deviation	2380.	2985.	3071.	2395.	2490.	1675.	2121.	2293.	3036.	2464.	2819.	2852.	2842.
Median	9207.	6828.	6900.	8300.	8300.	3900.	8000.	3300.	8200.	8750.	9900.	5700.	3333.
Head of Household's Occupation													
Mean	16.27	15.39	14.38	15.67	16.40	14.40	15.95	14.40	15.56	15.87	16.58	15.73	14.12
Standard Deviation	2.60	2.48	2.53	1.74	2.54	2.22	2.50	2.28	2.59	2.87	2.11	2.69	2.11
Median	16.76	15.58	13.25	15.75	16.84	14.17	15.92	14.00	15.84	16.00	16.79	15.00	13.50
Mother's Education													
Mean	6.55	6.52	6.37	6.68	6.45	6.40	6.67	6.57	6.61	6.71	6.64	6.54	6.00
Standard Deviation	0.97	0.88	0.97	0.78	0.99	0.84	0.90	0.60	0.91	0.82	0.78	1.07	0.88
Median	6.47	6.62	6.50	6.83	6.50	6.66	6.75	6.70	6.64	6.78	6.43	6.72	6.00
Sex													
Percent Female	47.3	57.1	54.2	45.5	65.0	50.0	63.2	40.0	55.6	66.7	64.3	50.0	73.7
Children's Ethnicity													
Percent Black	15.8	44.7	45.8	18.2	45.0	90.0	63.2	80.0	38.9	40.0	7.1	18.2	89.5
Percent White	80.7	49.3	54.2	81.8	55.0	10.0	31.6	20.0	61.1	60.0	92.9	36.4	0.0
Percent Spanish Speaking	3.6	6.0	0.0	0.0	0.0	0.0	5.3	0.0	0.0	0.0	0.0	45.5	10.5
First Language													
Percent English	98.5	98.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.5	89.5
Percent Spanish	1.5	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	10.5
Preschool Experience													
Percent Head Start	6.5	29.0	45.8	31.8	20.0	40.0	31.6	65.0	16.7	0.0	10.7	36.4	21.1
Percent Some Preschool	41.4	47.0	45.8	36.4	60.0	50.0	42.1	30.0	38.9	60.0	53.6	36.4	68.4
Percent No Preschool	52.1	24.0	8.3	31.8	20.0	10.0	26.3	5.0	44.4	40.0	35.7	27.3	10.5

for the Low Risk than for the High Risk groups. Most mothers of the Low Risk children have completed high school, and may have had some college, while the High Risk mothers have, on the average, only completed eight grades. The High Risk group contains greater proportions of minority group children (i.e., Black or Spanish speaking) than the Low Risk group.

Within both academic risk categories, there are substantial differences between FT and NFT groups in parental income, educational, and occupational status and in the ethnic compositions of the groups (see Tables II-10 and II-11). Both of the FT groups include primarily minority children, and are considerably more disadvantaged than the children in the corresponding NFT groups.

In general, the FT and NFT children in the High Risk category are more similar than those in the Low Risk category, where differences between the background characteristics of FT and NFT children are quite large.

Results

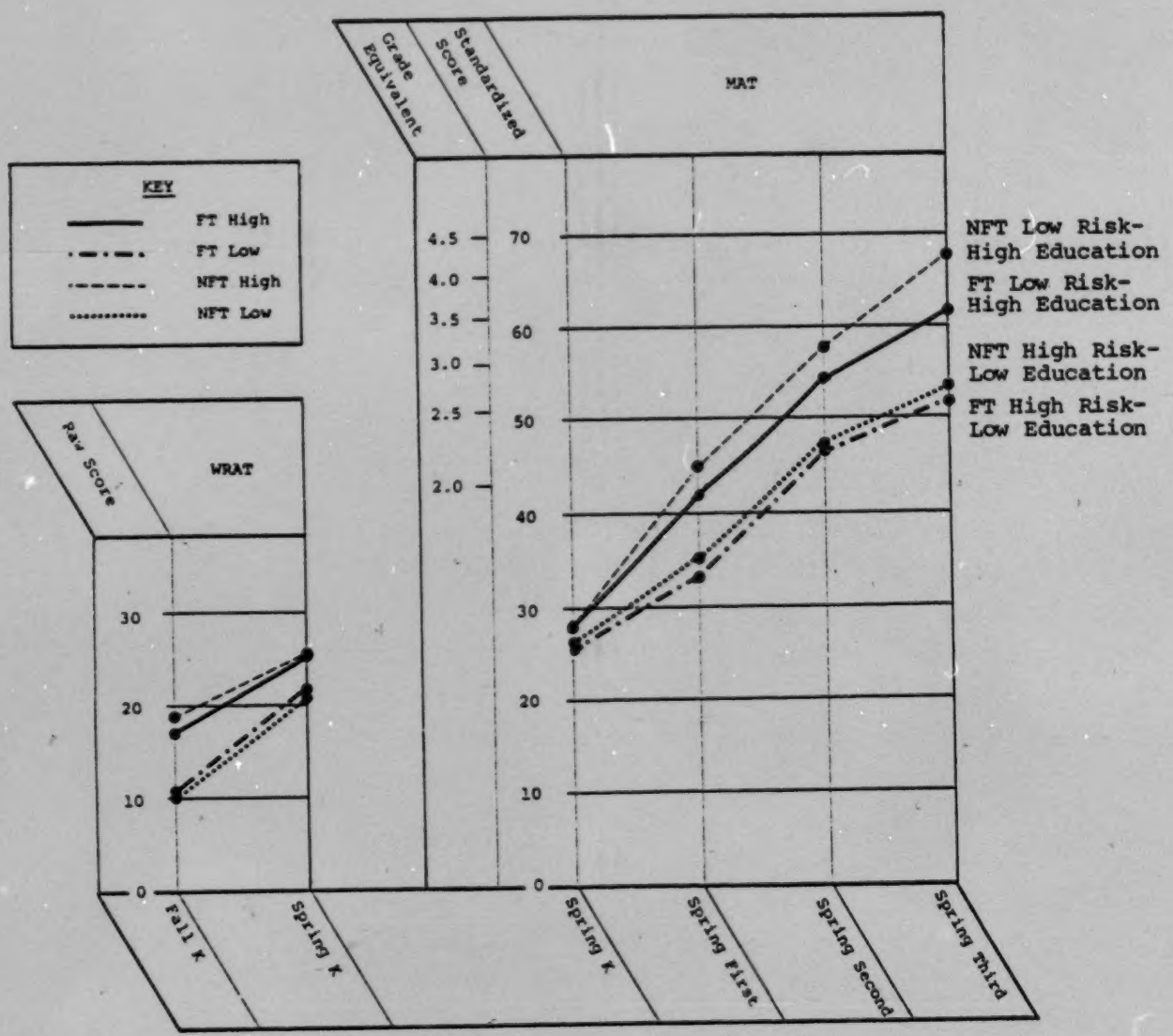
At entry to kindergarten Follow Through and non-Follow Through children classified as Low Risk scored higher than High Risk children on both the WRAT reading andmathematics subtests (see Tables II-12 and II-13). The MAT performance of all four groups (e.g., FT and NFT, High and Low Risk) is similar during kindergarten. However, in subsequent years the High Risk (low education) groups consistently achieved lower MAT reading and mathematics scores than the low risk (high education) groups and the graph diverges in the familiar "fan spread" pattern.

The median reading and mathematics scores of the two High Risk groups are virtually identical at each time point while the graphs for the two Low Risk groups diverge across years. The Low Risk NFT group consistently achieved higher reading and mathematics scores than the FT group. At the end of the third grade only 29 percent of the Low Risk Follow Through children scored at or above the NFT groups' median on reading and mathematics scores.

Within the individual sponsors' groups (Tables II-14 and II-15) there were too few children in the Low Risk category to make meaningful comparisons among sponsors. With regard to the High Risk (low education) groups (Tables II-16 and II-17), many of the sponsors' groups show no change in relative status across grades. However, several groups appear

Table II-12

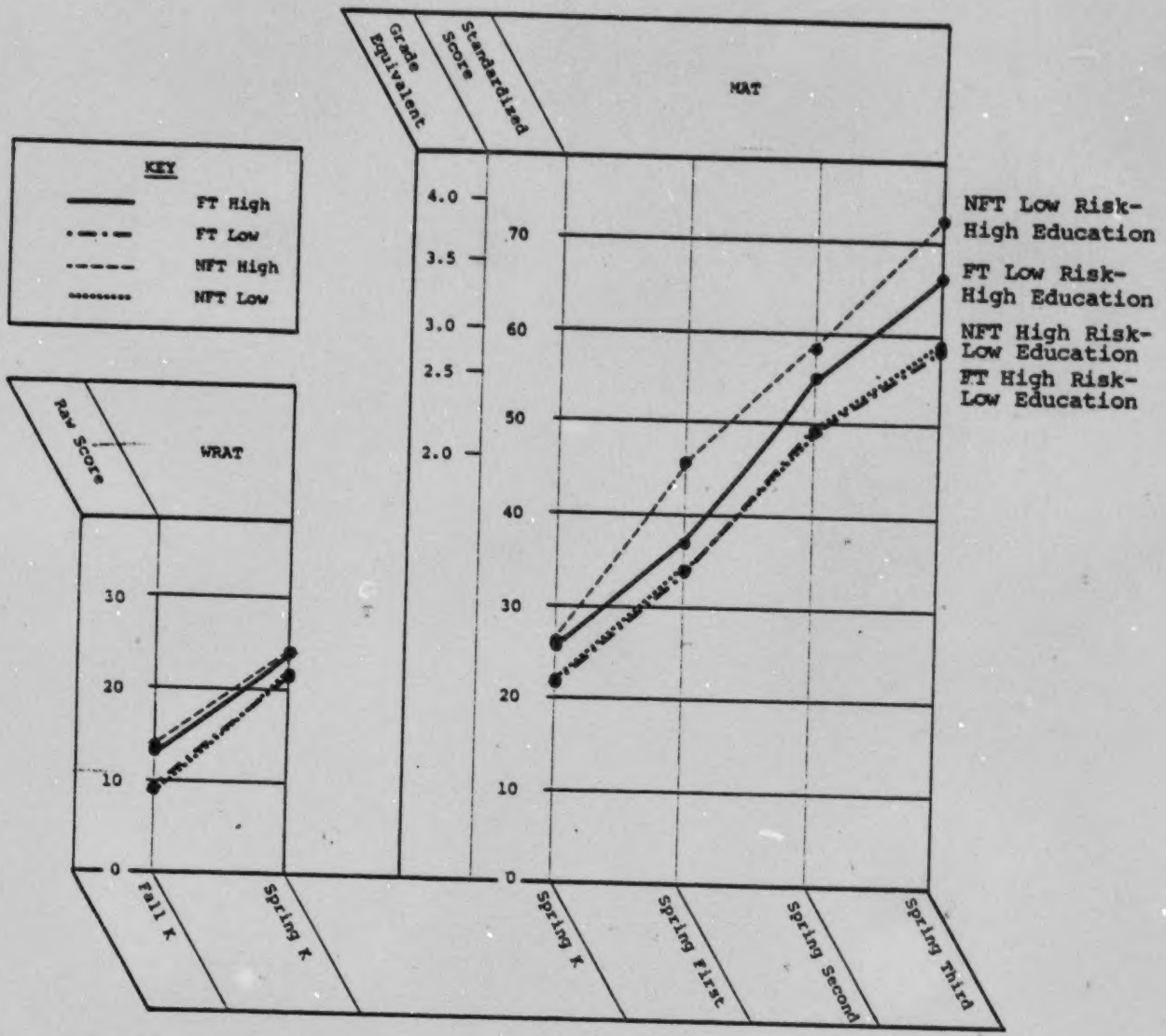
LONGITUDINAL PROFILE OF POOLED SPONSORS' AND POOLED NFT CHILDREN'S READING SCORES FOR THE HEAD OF HOUSEHOLD'S EDUCATION RISK DIMENSION



	Fall Kindergarten WRAT		Spring Kindergarten WRAT		Spring Kindergarten MAT		Spring First Grade MAT		Spring Second Grade MAT		Spring Third Grade MAT	
	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT
High Education Median	17.3	19.0	25.3	25.5	28.0	27.7	42.0	44.9	54.2	57.4	61.5	67.5
N	217	336	168	186	162	182	107	141	160	221	217	336
Percent ≥ NFT Median	41		48		59		39		36		29	
Low Education Median	10.8	10.1	21.9	20.7	26.1	25.9	33.0	35.2	46.5	47.1	51.5	53.1
N	490	413	370	227	358	212	256	199	319	246	490	413
Percent ≥ NFT Median	53		55		61		42		44		43	

Table II-13

LONGITUDINAL PROFILE OF POOLED SPONSORS' AND POOLED NFT CHILDREN'S MATHEMATICS SCORES FOR THE HEAD OF HOUSEHOLD'S EDUCATION RISK DIMENSION



	Fall Kindergarten WRAT		Spring Kindergarten WRAT		Spring Kindergarten MAT		Spring First Grade MAT		Spring Second Grade MAT		Spring Third Grade MAT	
	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT
High Education Median	13.0	13.7	23.9	24.0	25.5	26.0	36.7	45.5	55.0	58.1	66.1	72.5
N	217	336	168	186	162	184	103	130	160	216	217	336
Percent ≥ NFT Median	44		42		46		37		29		29	
Low Education Median	9.5	9.2	21.6	21.8	21.7	21.9	33.6	33.8	49.3	49.2	58.2	58.7
N	490	413	370	227	360	222	240	191	310	240	490	413
Percent ≥ NFT Median	50		52		52		51		49		49	

Table II-14

LONGITUDINAL PROFILE OF SPONSORS' LOW RISK-HIGH EDUCATION CHILDREN'S READING SCORES

	OVERALL NFT	OVERALL FT**
FALL KINDERGARTEN WRAT*		
Median	19.0	17.3
N	336	217
Percent ≥ NFT Median	--	41
SPRING KINDERGARTEN WRAT		
Median	25.5	25.3
N	186	168
Percent ≥ NFT Median	--	48
SPRING KINDERGARTEN MAT*		
Median	27.7	28.0
N	182	162
Percent ≥ NFT Median	--	59
SPRING FIRST GRADE MAT		
Median	44.9	42.0
N	141	107
Percent ≥ NFT Median	--	39
SPRING SECOND GRADE MAT		
Median	57.4	54.2
N	221	160
Percent ≥ NFT Median	--	36
SPRING THIRD GRADE MAT		
Median	67.5	61.5
N	336	217
Percent ≥ NFT Median	--	29

* WRAT scores are raw scores; MAT scores are publisher's standard scores.

** There were not enough cases to permit sponsor comparisons of high education children.

Table II-15

LONGITUDINAL PROFILE OF SPONSORS' LOW RISK-HIGH EDUCATION CHILDREN'S MATHEMATICS SCORES

	OVERALL NFT	OVERALL FT**
FALL KINDERGARTEN WRAT*		
Median	13.7	13.0
N	336	217
Percent ≥ NFT Median	--	44
SPRING KINDERGARTEN WRAT		
Median	24.0	23.9
N	186	168
Percent ≥ NFT Median	--	42
SPRING KINDERGARTEN MAT*		
Median	26.0	25.5
N	184	162
Percent ≥ NFT Median	--	46
SPRING FIRST GRADE MAT		
Median	45.5	36.7
N	130	103
Percent ≥ NFT Median	--	37
SPRING SECOND GRADE MAT		
Median	58.1	55.0
N	216	160
Percent ≥ NFT Median	--	29
SPRING THIRD GRADE MAT		
Median	72.5	66.1
N	336	217
Percent ≥ NFT Median	--	29

* WRAT scores are raw scores; MAT scores are publisher's standard scores.

** There were not enough cases to permit sponsor comparisons of high education children.

Table II-16

LONGITUDINAL PROFILE OF SPONSORS' HIGH RISK-LOW EDUCATION CHILDREN'S READING SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
FALL KINDERGARTEN WRAT*													
Median	10.2	10.8	10.4	10.7	11.6	11.5	12.3	11.0	10.8	11.2	13.5	9.7	12.0
N	413	490	33	48	31	26	70	35	32	43	16	134	22
Percent ≥ NFT Median	--	53	49	53	52	54	74	58	54	59	88	36	64
SPRING KINDERGARTEN WRAT													
Median	20.7	21.9	22.1	18.5	23.0	24.5	25.3	19.1	21.5	19.2	23.8	18.0	--
N	227	370	31	46	31	22	61	34	30	31	16	68	--
Percent ≥ NFT Median	--	55	68	37	68	64	75	45	54	49	88	37	--
SPRING KINDERGARTEN MAT*													
Median	25.9	26.1	26.2	25.6	25.8	27.0	27.6	26.0	26.0	26.0	26.8	25.4	--
N	212	358	31	47	29	22	58	31	28	31	16	65	--
Percent ≥ NFT Median	--	61	71	52	56	77	74	59	58	59	75	50	--
SPRING FIRST GRADE MAT													
Median	35.2	33.0	29.2	35.8	40.0	36.0	37.5	31.6	33.0	33.0	47.0	33.1	30.8
N	199	256	19	19	7	18	36	25	22	25	5	67	13
Percent ≥ NFT Median	--	42	27	53	72	56	58	28	46	40	80	37	8
SPRING SECOND GRADE MAT													
Median	47.1	46.5	48.2	42.9	49.5	45.5	48.3	47.0	50.0	43.0	47.5	44.5	--
N	246	319	23	42	26	22	57	30	22	35	16	46	--
Percent ≥ NFT Median	--	44	57	24	54	46	54	47	55	29	69	41	--
SPRING THIRD GRADE MAT													
Median	53.1	51.5	51.8	48.5	54.7	53.5	55.1	49.7	56.5	47.0	60.0	49.2	51.0
N	413	490	33	48	31	26	70	35	32	43	16	134	22
Percent ≥ NFT Median	--	43	39	33	52	50	56	40	56	21	75	39	41

*WRAT scores are raw scores; MAT scores are publisher's standard scores.

Table II-17

LONGITUDINAL PROFILE OF SPONSORS' HIGH RISK-LOW EDUCATION CHILDREN'S MATHEMATICS SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IBLP	SEDL	CAL PROCESS
FALL KINDERGARTEN WRAT*													
Median	9.2	9.5	9.9	9.0	9.2	10.2	10.5	10.7	8.5	8.6	12.0	8.7	11.0
N	413	490	33	48	31	26	70	35	32	43	16	134	22
Percent ≥ NFT Median	--	50	58	46	49	62	59	63	41	45	62	42	59
SPRING KINDERGARTEN WRAT													
Median	21.8	21.6	20.9	21.0	21.6	24.5	24.4	22.1	21.8	20.7	23.5	20.2	--
N	227	370	31	46	31	22	61	34	30	31	16	66	--
Percent ≥ NFT Median	--	52	42	42	52	77	77	65	54	36	75	29	--
SPRING KINDERGARTEN MAT*													
Median	21.9	21.7	20.0	20.1	19.8	23.5	29.1	22.6	21.8	20.7	25.5	20.6	--
N	222	360	31	45	30	22	59	31	30	30	16	66	--
Percent ≥ NFT Median	--	52	39	38	33	64	85	62	57	37	62	37	--
SPRING FIRST GRADE MAT													
Median	33.8	33.6	30.0	33.2	23.5	30.0	36.5	28.5	33.6	37.0	45.0	33.7	32.0
N	191	240	19	18	6	17	34	22	21	23	4	65	11
Percent ≥ NFT Median	--	51	27	45	50	29	68	32	53	78	100	51	46
SPRING SECOND GRADE MAT													
Median	49.2	49.3	47.5	46.5	49.0	52.8	53.2	44.0	49.0	48.2	54.5	49.2	--
N	240	310	24	42	25	21	53	29	24	33	16	43	--
Percent ≥ NFT Median	--	49	42	36	48	62	68	38	46	39	94	49	--
SPRING THIRD GRADE MAT													
Median	58.7	58.2	52.0	54.8	57.3	61.0	64.1	54.2	56.5	56.3	68.5	59.0	57.8
N	413	490	33	48	31	26	70	35	32	43	16	134	22
Percent ≥ NFT Median	--	49	36	35	45	58	67	49	41	35	75	51	37

*WRAT scores are raw scores; MAT scores are publisher's standard scores.

in a more favorable position relative to non-Follow Through at the end of the program while others appear to be in a less favorable position. In reading, the Responsive Education children started about even with NFT (49 percent of the group scored at or above the NFT median). The group then achieved a higher status at the end of first grade (71 percent of the group scored above the NFT median) but dropped back to a relatively lower status at the end of third grade (only 34 percent scored above the NFT median). The Direct Instruction program showed a similar pattern in reading. Three programs, TEEM, EDC and Cal Process, show a substantial dropacross grades while the remaining sponsors maintain a constant status relative to NFT over the four years. In math, only the Behavior Analysis model shows modest progress across the grades while most of the remaining sponsors' groups show little change. Three programs, Responsive Education, Cognitive Curriculum and Cal Process, show a substantial drop relative to NFT.

These results suggest that the models which consistently achieve the best results with the High Risk children are those with curricula which place the greatest emphasis on attaining basic skills. It should be noted, however, that with the exception of the IELP model's reading scores and the IELP and Behavior Analysis model's mathematics scores, all of the High Risk groups scores indicated performance which is at least a year below that typical of third grade children. In general, the expected relationship between the parents' level of education and children's school performance does not appear to have been disrupted for the groups of children in this study.

PATTERNS OF OUTCOMES FOR THE KINDERGARTEN PPVT RISK INDICATOR

Children can be considered educationally disadvantaged with regard to the skills they bring to school. That is, for whatever reason, at entry into the public school system children may lack necessary verbal skills and experiences, which would allow them to take advantage of or at least cope successfully with schooling.

The child's level of performance on the Peabody Pictury Vocabulary Test* at entry to kindergarten is likely to be, in part, a consequence of the child's exposure to the dominant majority culture. Performance on this

* The Peabody Picture Vocabulary Test is an individually-administered measure of children's receptive verbal ability.

test is consistently related to socioeconomic status, and tends to provide a conservative estimate of the abilities and potential of disadvantaged minority children. For example, disadvantaged children from ethnic minority groups generally obtain lower scores on the Peabody Picture Vocabulary Test than on other intelligence tests (Sattler, 1974). A number of researchers speculate that their lower PPVT scores may in part be a reflection of their verbal and experiential deficiencies (Milgram and Ozer, 1967), and that the PPVT may be considered as a measure of cultural assimilation for minority group children (Cole, 1966).

In this study, the Peabody Picture Vocabulary Test provides a measure of the degree to which disadvantaged children entering school have been exposed to the majority culture and concepts. The children with the least exposure to or familiarity with vocabulary concepts and information which they are expected to use in school are at greater risk of academic underachievement than children who are already familiar with the concepts and vocabulary used in school. Children whose Peabody Picture Vocabulary Test scores were in the top third of the combined FT and NFT distribution were considered to be at Low Risk of academic underachievement, and children whose scores were at the bottom of the distribution were considered to be at High Risk of academic underachievement.

Sample Description of Peabody Picture Vocabulary Test Risk Indicator Groups

The children designated as being at Low Risk according to their PPVT scores (high entry PPVT scores) were generally more advantaged than those designated as being at High Risk (low entry PPVT scores). On the average, their parents had higher incomes, and higher status mobs. Their mothers were also better educated than the mothers of High Risk children (e.g., high school completed vs. high school not completed). Minority group children were the majority in the High Risk groups while Whites were the majority in the Low Risk groups.

The NFT children in both the High and Low Risk groups were more advantaged than the NFT children; however, as Tables II-18 and II-19 indicate, the mismatch between the FT and NFT children is most pronounced in the Low Risk groups. In particular, about eighty percent of the Low Risk NFT children are White as compared with fifty percent of the FT children.

Table II-18

BACKGROUND CHARACTERISTICS OF CHILDREN IN THE HIGH RISK - LOW PPVT CATEGORY

LOW PPVT	NON-FOLLOW THROUGH	FOLLOW THROUGH	RESPONSIVE EDUCATION	TEEN	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
Number of Children	562	734	38	73	50	48	158	69	43	64	21	139	31
Family Income in Dollars													
Mean	4832.	4250.	3684.	4821.	4874.	3702.	4340.	4304.	4479.	4667.	4119.	3705.	4210.
Standard Deviation	2684.	2363.	2166.	2231.	2668.	2026.	2629.	2471.	2390.	2250.	2323.	2083.	2055.
Median	4400.	3796.	3556.	4950.	4733.	3220.	3268.	.3800.	4333.	4400.	3733.	3200.	3867.
Head of Household's Occupation													
Mean	13.07	12.94	13.03	12.89	13.51	12.96	12.72	12.83	12.84	13.04	13.27	12.97	12.90
Standard Deviation	1.80	1.69	1.68	1.55	1.79	1.39	1.42	1.46	1.56	1.43	2.05	2.21	1.44
Median	12.90	12.78	12.72	12.93	13.24	12.79	12.49	12.74	12.40	12.89	12.82	12.89	12.60
Mother's Education													
Mean	4.86	4.93	5.00	4.75	5.00	5.17	5.21	5.20	5.19	5.12	5.45	4.12	5.37
Standard Deviation	1.23	1.19	1.04	1.44	1.13	.76	.98	.80	1.15	.79	.68	1.42	1.23
Median	5.01	5.10	5.14	5.03	5.10	5.20	5.22	5.25	5.32	5.14	5.40	4.19	5.67
Sex													
Percent Female	52.7	52.0	55.3	50.7	58.0	47.9	51.9	44.9	55.8	50.0	52.4	51.1	67.7
Children's Ethnicity													
Percent Black	67.1	73.4	78.9	67.1	76.0	91.7	90.5	97.1	81.4	87.5	76.2	25.2	83.9
Percent White	17.6	7.4	7.9	9.6	24.0	6.3	1.3	1.4	11.6	12.5	23.8	5.8	0.0
Percent Spanish Speaking	15.3	19.2	13.2	23.3	0.0	2.1	8.2	1.4	7.0	0.0	0.0	69.1	16.1
First Language													
Percent English	83.5	82.6	89.5	79.5	90.0	100.0	93.7	98.6	93.0	100.0	100.0	38.8	83.9
Percent Spanish	13.7	16.8	10.5	20.5	0.0	0.0	6.3	1.4	7.0	0.0	0.0	61.2	16.1
Preschool Experience													
Percent Head Start	23.5	49.9	55.3	74.0	24.0	66.7	48.1	63.8	20.9	29.7	71.4	55.4	22.6
Percent Some Preschool	21.2	27.9	42.1	16.4	34.0	20.8	22.2	21.7	44.2	59.4	0.0	16.5	64.5
Percent No Preschool	55.3	22.2	2.6	9.6	42.0	12.5	29.7	14.5	34.9	10.9	28.6	28.1	12.9

Table II-19

BACKGROUND CHARACTERISTICS OF CHILDREN IN THE LOW RISK - HIGH PPVT CATEGORY

HIGH PPVT	NON-FOLLOW THROUGH	FOLLOW THROUGH	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
Number of Children	855	690	93	72	41	44	68	37	74	66	112	41	42
Family Income in Dollars													
Mean	7562.	5848.	5322.	6604.	6800.	3648.	4940.	5070.	5748.	6651.	7043.	6083.	4748.
Standard Deviation	2531.	2890.	2714.	2709.	2784.	1915.	2754.	2971.	3135.	2853.	2672	2800	2513
Median	8178.	5606.	4712.	6300.	7400.	3186.	4250.	4200.	4500.	7150.	7400.	5766.	4500.
Head of Household's Occupation													
Mean	14.68	13.95	13.40	14.10	14.88	13.78	13.71	13.39	13.62	14.15	14.78	13.95	13.08
Standard Deviation	2.52	2.27	2.10	2.06	2.73	2.03	2.31	2.06	2.03	2.18	2.43	2.43	1.78
Median	14.01	13.33	12.74	13.77	13.92	13.40	13.16	12.95	13.08	13.50	14.12	13.35	12.72
Mother's Education													
Mean	5.93	5.71	5.75	5.75	5.94	5.74	5.49	5.63	5.67	5.77	6.06	5.02	5.41
Standard Deviation	1.04	1.03	0.82	0.85	1.02	0.84	1.13	1.26	0.99	0.83	0.76	1.60	1.28
Median	5.95	5.80	5.82	5.80	5.94	5.81	5.43	5.85	5.68	5.75	6.00	5.30	5.76
Sex													
Percent Female	47.0	49.1	53.8	48.6	58.5	38.6	54.4	37.8	45.9	45.5	48.2	51.2	54.8
Children's Ethnicity													
Percent Black	12.4	37.8	26.9	40.3	39.0	63.6	67.6	51.4	25.7	47.0	10.7	9.8	76.2
Percent White	81.8	53.3	66.7	56.9	61.0	36.4	30.9	21.6	62.2	53.0	89.3	34.1	0.0
Percent Spanish Speaking	5.8	8.8	6.5	2.8	0.0	0.0	1.5	27.0	12.2	0.0	0.0	56.1	23.8
First Language													
Percent English	98.2	95.4	100.0	97.2	100.0	100.0	98.5	89.2	93.2	100.0	100.0	73.2	76.2
Percent Spanish	2.0	4.6	0.0	1.4	0.0	0.0	1.5	10.8	6.8	0.0	0 0	26.8	23.8
Preschool Experience													
Percent Head Start	15.0	39.4	50.5	44.4	24.4	47.4	50.0	56.8	35.1	22.7	30.4	46.3	31.0
Percent Some Preschool	31.2	34.5	24.7	22.2	53.7	45.5	29.4	35.1	28.4	48.5	28.6	29.3	64.3
Percent No Preschool	53.8	26.1	24.7	33.3	22.0	6.8	20.6	8.1	36.5	28.8	41.1	24.4	4.8

Results

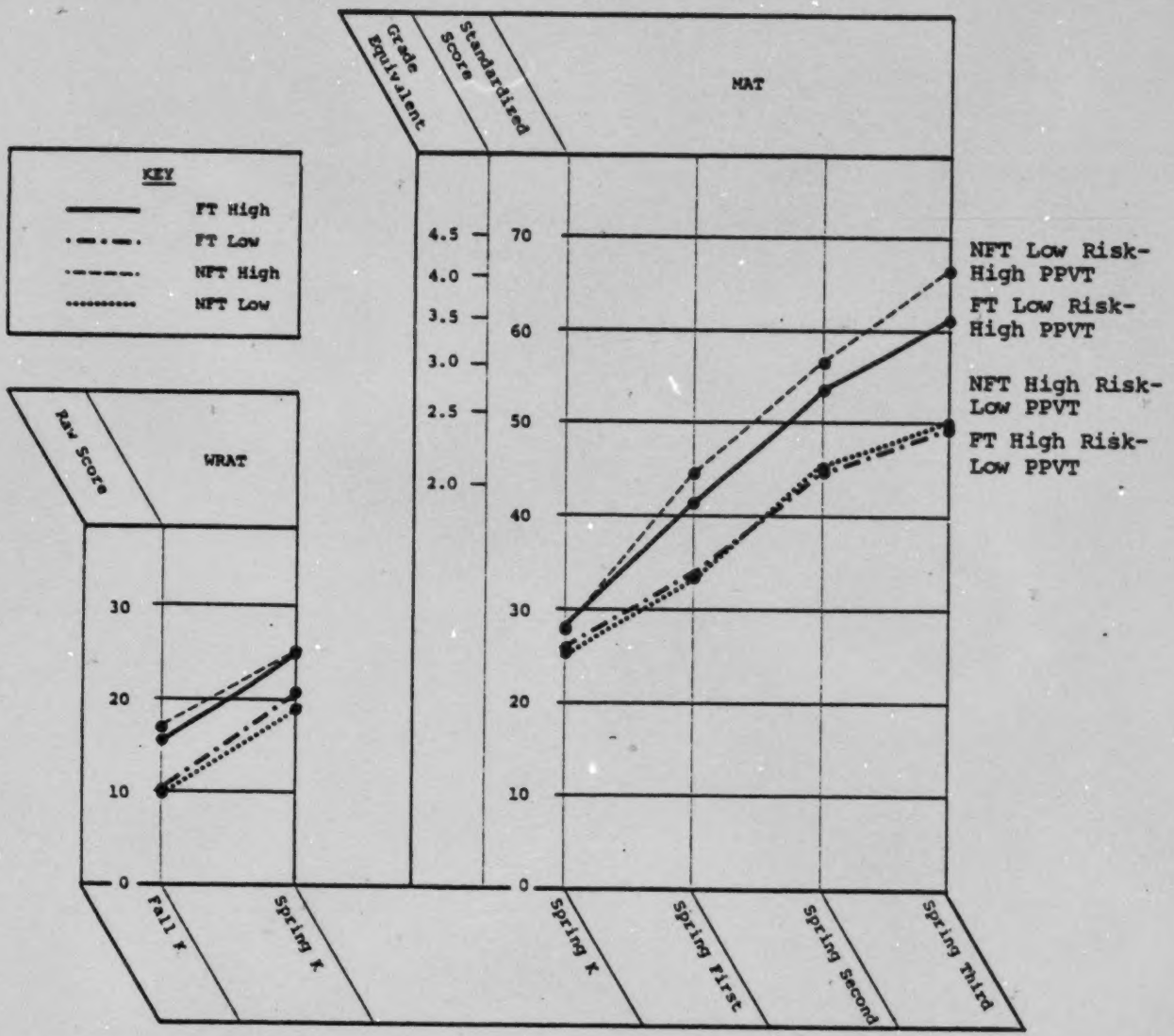
At entry to kindergarten, Follow Through and non-Follow Through children classified as Low Risk scored higher than High Risk children on both the WRAT reading and mathematics subtests (see Tables II-20 and II-21). The performance of all four groups was similar on the MAT reading and mathematics tests at the end of kindergarten. However, as was the case with the income and education risk indicators, the performance of High Risk children was consistently below the level of the Low Risk groups at each of the subsequent time points. The median reading and mathematics scores of the two High Risk (low PPVT) groups were virtually identical at each time point. However, the Low Risk NFT group consistently received higher reading and mathematics scores than the Low Risk FT group. At the end of third grade, only 33 percent of the Low Risk FT children had reading and mathematics scores at or above the NFT levels. Without exception each sponsor's Low Risk group performed better than the High Risk group (see Tables II-22 through II-25). The Low Risk groups' test performance was generally appropriate for third grade at the end of third grade, while the High Risk groups' scores were substantially below grade level. The median scores of all children in the sponsors' High Risk groups were at least a year behind the scores appropriate for their grade levels.

Most sponsors' High Risk groups show no change in reading or math relative to NFT over the course of the program. However, the TEEM, EDC, Cognitive Curriculum, Parent Education and Cal Process groups all lose ground relative to NFT in reading (see Table II-22), while the Direct Instruction, Cognitive Curriculum and EDC programs all lose ground in math.

Among the Low Risk groups, a similar pattern emerges. Most sponsors' Low Risk groups maintain their status relative to NFT across the grades. However, a number of programs appear to lose ground (see Tables II-24 and II-25) in reading. The EDC, Behavior Analysis and Cal Process groups all have relatively fewer children with scores at or above the NFT median at the end of the program than they had at the beginning. Similarly in math, the Bank Street, Cognitive Curriculum, Parent Education and Cal Process groups appear to fall behind. There is one exception to the trend of maintenance or loss of status. the IELP pattern in reading shows a modest increase across grades.

Table II-20

LONGITUDINAL PROFILE OF POOLED SPONSORS' AND POOLED NFT CHILDREN'S READING SCORES FOR THE ENTRY TEST (PPVT*) RISK DIMENSION

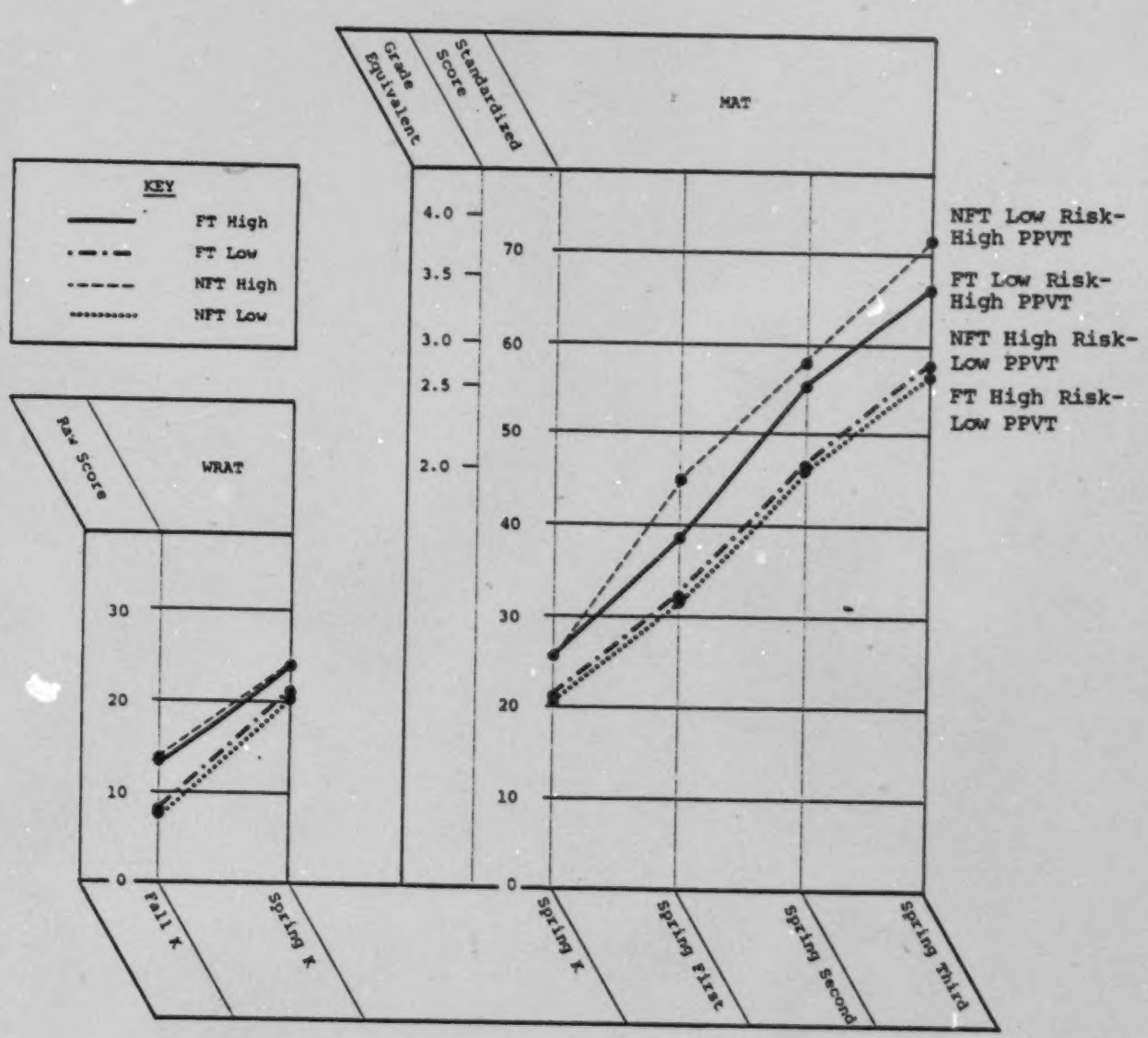


	Fall Kindergarten WRAT		Spring Kindergarten WRAT		Spring Kindergarten MAT		Spring First Grade MAT		Spring Second Grade MAT		Spring Third Grade MAT	
	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT
High PPVT Median	15.7	16.8	25.0	25.1	27.7	27.6	41.1	44.3	53.5	56.4	61.3	66.4
N	690	855	572	502	562	493	371	391	515	564	690	855
Percent ≥ NFT Median	46		42		53		36		39		33	
Low PPVT Median	10.1	9.8	20.8	19.0	25.8	25.3	32.4	32.3	44.7	45.1	49.2	49.9
N	734	562	545	281	537	260	371	226	483	303	734	562
Percent ≥ NFT Median	61		56		56		50		45		49	

*Peabody Picture Vocabulary Test

Table II-21

LONGITUDINAL PROFILE OF POOLED SPONSORS' AND POOLED NFT CHILDREN'S MATHEMATICS SCORES FOR THE ENTRY TEST (PPVT*) RISK DIMENSION



		Fall Kindergarten WRAT		Spring Kindergarten WRAT		Spring Kindergarten MAT		Spring First Grade MAT		Spring Second Grade MAT		Spring Third Grade MAT	
		FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT
High PPVT	Median	13.1	13.3	24.0	24.0	25.8	25.8	38.5	44.8	55.1	57.7	66.2	71.8
	N	690	855	572	502	553	487	360	368	513	547	690	855
Percent ≥ NFT Median		46		44		51		39		38		33	
Low PPVT	Median	8.1	7.8	21.2	20.3	21.0	20.5	32.3	31.7	46.1	45.7	57.6	56.4
	N	734	562	545	281	533	274	347	210	459	290	734	562
Percent ≥ NFT Median		54		60		55		57		53		53	

* Peabody Picture Vocabulary Test

Table II-22

LONGITUDINAL PROFILE OF SPONSORS' HIGH RISK-LOW PPVT**
CHILDREN'S READING SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS	
FALL KINDERGARTEN WRAT*														
Median	9.8	10.1	9.9	10.3	11.7	11.0	10.2	9.7	10.5	10.2	10.2	9.1	11.2	
N	562	734	38	73	50	48	158	69	43	64	21	139	31	
Percent ≥ NFT Median	--	61	58	67	72	71	66	54	63	80	67	45	68	
SPRING KINDERGARTEN WRAT														
Median	19.0	20.8	20.1	18.8	22.5	23.0	22.7	19.4	20.2	21.3	21.9	15.9	--	
N	281	545	35	70	46	41	126	65	39	49	21	53	--	
Percent ≥ NFT Median	--	56	66	51	70	66	67	49	56	58	71	36	--	
SPRING KINDERGARTEN MAT*														
Median	25.3	25.8	25.8	25.0	26.3	26.4	26.2	25.5	25.0	25.9	26.3	24.9	--	
N	260	537	35	72	46	42	122	60	36	52	21	51	--	
Percent ≥ NFT Median	--	56	57	47	61	71	65	50	42	58	62	43	--	
SPRING FIRST GRADE MAT														
Median	32.3	32.4	30.7	33.2	30.0	40.7	33.1	26.9	28.5	34.0	--	32.6	29.2	
N	226	371	23	34	18	31	74	34	28	36	--	77	15	
Percent ≥ NFT Median	--	50	35	56	45	81	55	24	36	64	--	51	20	
SPRING SECOND GRADE MAT														
Median	45.1	44.7	44.5	43.6	47.0	51.0	46.2	40.5	45.0	42.1	44.0	42.5	--	
N	303	483	32	67	39	39	114	54	31	50	19	38	--	
Percent ≥ NFT Median	--	45	37	37	59	69	54	24	45	32	68	42	--	
SPRING THIRD GRADE MAT														
Median	49.9	49.2	47.5	49.8	54.1	55.7	51.9	46.9	48.0	45.7	50.0	48.4	46.7	
N	562	734	38	72	50	48	158	69	43	64	21	139	31	
Percent ≥ NFT Median	--	49	42	39	66	73	59	36	40	33	67	44	32	

*WRAT scores are raw scores; MAT scores are publisher's standard scores.
**Peabody Picture Vocabulary Test.

Table II-23

LONGITUDINAL PROFILE OF SPONSORS' HIGH RISK-LOW PPVT** CHILDREN'S MATHEMATICS SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS	
FALL KINDERGARTEN WRAT*														
Median	7.8	8.1	6.1	8.3	7.8	9.5	8.0	9.0	9.1	7.7	8.0	7.0	8.4	
N	562	734	38	73	50	48	158	69	43	64	21	139	31	
Percent ≥ NFT Median	--	54	40	53	54	65	55	61	70	52	48	46	64	
SPRING KINDERGARTEN WRAT														
Median	20.3	21.2	20.4	20.9	20.5	23.4	22.1	20.9	21.6	20.6	21.9	18.8	--	
N	281	545	35	70	46	41	126	65	39	49	21	53	--	
Percent ≥ NFT Median	--	60	49	57	50	93	71	54	56	53	81	34	--	
SPRING KINDERGARTEN MAT*														
Median	20.5	21.0	21.0	19.4	19.2	25.3	23.5	20.7	21.7	20.5	21.4	19.6	--	
N	274	533	33	71	42	41	125	61	38	51	21	50	--	
Percent ≥ NFT Median	--	55	55	35	39	74	72	53	60	51	67	38	--	
SPRING FIRST GRADE MAT														
Median	31.7	32.3	32.3	32.8	30.5	33.2	33.1	21.3	33.5	34.7	--	32.3	30.5	
N	210	347	23	29	14	29	70	31	26	36	--	74	14	
Percent ≥ NFT Median	--	57	61	66	43	66	59	16	58	75	--	59	50	
SPRING SECOND GRADE MAT														
Median	45.7	46.1	45.2	47.6	40.2	52.2	48.8	39.2	46.8	43.3	44.5	44.5	--	
N	290	459	32	65	33	26	95	53	35	51	20	38	--	
Percent ≥ NFT Median	--	53	47	62	45	27	60	28	54	49	75	50	--	
SPRING THIRD GRADE MAT														
Median	56.4	57.6	55.0	57.6	55.5	67.5	58.5	51.6	55.8	54.0	58.0	58.1	57.8	
N	562	734	38	73	50	44	158	69	43	64	21	139	31	
Percent ≥ NFT Median	--	53	42	52	50	32	58	36	47	39	57	58	58	

*WRAT scores are raw scores; MAT scores are publisher's standard scores.
**Peabody Picture Vocabulary Test

Table II-24

LONGITUDINAL PROFILE OF SPONSORS' LOW RISK-HIGH PPVT**
CHILDREN'S READING SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS	
FALL KINDERGARTEN WRAT*														
Median	16.8	15.7	15.6	16.5	19.0	13.8	18.5	14.7	12.7	16.1	15.9	14.8	21.0	
N	855	690	93	72	41	44	68	37	74	66	112	41	42	
Percent ≥ NFT Median	--	46	46	50	59	28	62	38	32	49	46	32	67	
SPRING KINDERGARTEN WRAT														
Median	25.1	25.0	25.2	25.2	25.5	25.5	26.4	23.8	24.2	24.7	25.3	22.3	--	
N	502	572	92	70	29	24	63	36	71	53	111	23	--	
Percent ≥ NFT Median	--	42	42	46	52	50	62	25	31	32	46	13	--	
SPRING KINDERGARTEN MAT*														
Median	27.6	27.7	26.8	27.7	28.0	29.0	29.0	26.7	27.3	26.7	28.6	25.9	--	
N	493	562	87	70	28	24	62	36	71	52	110	22	--	
Percent ≥ NFT Median	--	53	44	53	68	71	73	42	48	39	64	23	--	
SPRING FIRST GRADE MAT														
Median	44.3	41.1	39.2	41.5	37.7	45.8	44.2	30.0	39.5	33.5	47.4	39.8	39.0	
N	391	371	45	44	25	24	37	27	40	24	63	21	21	
Percent ≥ NFT Median	--	36	31	43	20	58	49	11	25	17	65	10	19	
SPRING SECOND GRADE MAT														
Median	56.4	53.5	51.4	53.6	56.5	54.1	53.0	48.0	51.3	51.0	59.5	49.0	--	
N	564	515	77	66	26	28	54	36	54	49	108	17	--	
Percent ≥ NFT Median	--	39	32	33	50	43	31	22	31	33	63	24	--	
SPRING THIRD GRADE MAT														
Median	66.4	61.3	60.6	62.5	65.0	60.7	61.7	56.2	61.0	56.1	70.2	57.2	55.0	
N	885	690	93	72	41	44	68	37	74	66	112	41	42	
Percent ≥ NFT Median	--	33	30	36	46	25	31	22	27	18	62	17	19	

*WRAT scores are raw scores; MAT scores are publisher's standard scores.
**Peabody Picture Vocabulary Test

Table II-25

LONGITUDINAL PROFILE OF SPONSORS' LOW RISK-HIGH PPVT
CHILDREN'S MATHEMATICS SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
FALL KINDERGARTEN WRAT*													
Median	13.3	13.1	12.1	13.0	13.3	12.5	13.7	13.1	12.3	13.5	13.8	12.6	13.7
N	855	690	93	72	41	44	68	37	74	66	112	41	42
Percent ≥ NFT Median	--	46	40	44	49	32	53	46	36	50	54	39	55
SPRING KINDERGARTEN WRAT													
Median	24.0	24.0	23.5	23.6	24.0	24.5	26.6	23.5	23.3	23.1	26.4	21.8	--
N	502	572	92	70	29	24	63	36	71	53	111	23	--
Percent ≥ NFT Median	--	44	50	53	45	50	70	42	46	31	76	35	--
SPRING KINDERGARTEN MAT*													
Median	25.8	25.8	22.8	23.6	23.3	30.5	31.9	25.1	24.5	24.0	30.9	22.3	--
N	487	553	82	71	27	24	60	36	70	50	110	23	--
Percent ≥ NFT Median	--	51	37	37	37	71	90	48	37	40	73	17	--
SPRING FIRST GRADE MAT													
Median	44.8	38.5	37.5	35.5	35.1	38.0	49.0	32.8	38.7	40.2	52.0	37.0	36.8
N	368	360	42	42	24	23	37	26	37	25	62	21	21
Percent ≥ NFT Median	--	39	38	24	30	27	59	8	35	36	68	38	29
SPRING SECOND GRADE MAT													
Median	57.7	55.1	53.7	54.0	56.7	52.5	58.5	50.6	53.5	56.0	58.9	54.3	--
N	547	513	79	66	23	26	56	35	54	48	109	17	--
Percent ≥ NFT Median	--	38	32	30	44	27	52	20	20	31	58	35	--
SPRING THIRD GRADE MAT													
Median	71.8	66.2	65.2	68.5	65.5	67.5	70.1	62.6	62.4	65.0	72.8	65.0	64.5
N	855	690	93	72	41	44	68	37	74	66	112	41	42
Percent ≥ NFT Median	--	33	28	39	24	32	46	19	19	24	54	32	26

*WRAT scores are raw scores; MAT scores are publisher's standard scores.
**Peabody Picture Vocabulary Test

PATTERNS OF OUTCOMES FOR THE PARENTS' LOCUS OF CONTROL RISK INDICATOR

The parents' locus of control (internal vs. external) can be viewed as an indicator of one aspect of the psychosocial climate in the home environment. Locus may reflect the perception of the amount of genuine control one can exert over one's own fate. Thus, an individual's locus of control may be a consequence of income and education and other variables which help to establish one's place in social hierarchies. Several studies (Mercer, 1974; Cicarelli, 1969; Obgu, 1974) suggest that lower external scores on parents' locus of control are associated with higher levels of school achievement by their children. Researchers speculate that parents who perceive that they are in greater control of their own fates are able to provide more resources for their children and to teach them strategies for dealing with people and institutions (Ogbu, 1974; Tomlinson, 1973).

The parents' scores on a locus of control scale serve as the indicator of the psychosocial home environment for this study. Items in this scale are:

- No matter how hard a person tried, he can't do much about what happens to him.
- A person shouldn't plan ahead because things don't usually work out.
- If parents do not agree with people in the schools, there's not much parents can do.

Responses to these items were standardized and summed to create a scale. A high score represents an internal locus of control or positive feelings of efficacy; a low score represents an external locus of control or feelings of inefficacy. In this study, children of respondents who feel that they exert very little control over their own fates, i.e., who have an external locus of control, are considered to be at greater risk of academic underachievement than children of respondents who feel that they control their own fates, i.e., who have an internal locus of control.

Sample Description of the Parent Locus of Control Risk Groups

Parents with an Internal Locus of Control (Low Risk) tend to have higher incomes, occupations with higher status, and higher levels of education than parents with an External Locus of Control (High Risk). There are

also differences in the ethnic compositions of the Internal and External Locus groups which are striking. The External group (High Risk) is composed primarily of minority group members (Black and Spanish speaking) while the Internal Locus group (Low Risk) contains more White children with the exception of the Low Risk FT group which is predominantly Black.

There are large disparities between FT and NFT groups within both the High and Low Risk categories with regard to income, occupational status and ethnic composition (see Tables II-26 and II-27). In general, the disparities are greatest between FT and NFT children in the Low Risk groups.

Results

The parents' locus scores when the child is in kindergarten do not differentiate among the various groups (see Tables II-28 and II-29). Although the rank ordering of the groups' outcomes was the same as the rank ordering for the other indicators (i.e., Low Risk Groups receiving higher scores than High Risk groups and NFT groups receiving higher scores than FT groups), the differences among the groups' scores were much smaller than differences found with the other three risk indicators.

As the results in Tables II-30 through II-33 indicate, none of the sponsors' High Risk children have median reading scores which are materially greater than those of the NFT group at the end of third grade. Furthermore, the median scores of all of the High Risk groups are substantially below the scores appropriate for their grade levels. For eight of the eleven sponsors, the group appears to beless well off at the end of third grade on either reading, math, or both measures. For TEEM, Responsive Education, Bank Street, Cognitive Curriculum, Parent Education, EDC, IELP and Cal Process, fewer children scored at or above the NFT median at the end of third grade than at entry to kindergarten. Surprisingly, the same pattern emerges for the Low Risk groups in reading but not in math. In reading, nine of the eleven Low Risk groups lose ground relative to NFT across the duration of the program. However, in math most Low Risk groups maintain their status.

In general the parents' internal or external locus of control score when the child enters kindergarten is not a potent differentiator among children at different degrees of academic risk. Using this indicator we find very small differences between the performance of the High and Low Risk groups, and very small differences between the performance of the

Table II-26

BACKGROUND CHARACTERISTICS OF CHILDREN
IN THE LOW LOCUS - HIGH RISK CATEGORY

LOW LOCUS	NON-FOLLOW THROUGH	FOLLOW THROUGH	RESPONSIVE EDUCATION	TEEN	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
Number of Children	642	690	45	54	40	56	115	68	41	59	40	138	34
Family Income in Dollars													
Mean	5283.	4450.	5024.	5633.	5350.	3961.	4445.	3860.	4363.	5295.	4720.	4019.	4418.
Standard Deviation	2776.	2499.	2915.	2337.	2627.	2143.	2589.	2405.	2853.	2519.	2429.	2274.	2318.
Median	5000.	3877.	4150.	4200.	5200.	3300.	3800.	3133.	3800.	5080.	4167.	3734.	4200.
Head of Household's Occupation													
Mean	13.22	13.00	13.03	13.19	13.74	12.78	12.64	12.96	12.83	12.99	13.40	13.03	13.23
Standard Deviation	1.91	1.71	1.68	1.66	2.02	1.32	1.36	1.27	1.43	1.47	2.06	2.11	1.85
Median	13.01	12.82	12.85	12.92	13.35	12.77	12.43	12.75	12.55	12.88	13.05	12.95	12.67
Mother's Education													
Mean	4.91	4.91	5.35	4.90	5.10	5.09	4.97	5.13	5.21	5.17	5.55	3.95	5.41
Standard Deviation	1.26	1.22	1.10	1.28	1.16	0.90	1.00	0.96	1.13	0.75	0.7[illegible]	1.46	1.05
Median	5.06	5.10	5.60	5.09	5.30	5.08	5.12	5.22	5.29	5.16	5.68	4.01	5.53
Sex													
Percent Female	55.3	53.5	62.2	57.4	60.0	55.4	47.8	50.0	46.3	54.2	47.5	54.3	61.8
Children's Ethnicity													
Percent Black	51.1	66.5	64.4	63.0	72.5	87.5	90.4	91.2	75.6	69.5	47.5	22.5	88.2
Percent White	31.5	14.9	31.1	20.4	27.5	12.5	3.5	1.5	14.6	30.5	52.5	7.2	0.0
Percent Spanish Speaking	17.4	18.6	4.4	16.7	0.0	0.0	6.1	7.4	9.8	0.0	0.0	70.3	11.8
First Language													
Percent English	86.0	84.9	100.0	85.2	92.5	100.0	95.7	97.1	92.7	100.0	100.0	42.8	88.2
Percent Spanish	12.0	14.6	0.0	14.8	0.0	0.0	4.3	2.9	7.3	0.0	0.0	57.2	11.8
Preschool Experience													
Percent Head Start	25.9	50.4	55.6	66.7	25.0	71.4	49.6	66.2	31.7	32.2	65.0	49.3	26.5
Percent Some Preschool	22.0	27.8	33.3	16.7	50.0	17.9	23.5	22.1	31.7	47.5	12.5	21.7	58.8
Percent No Preschool	52.2	21.7	11.1	16.7	25.0	10.7	27.0	11.8	36.6	20.3	22.5	29.0	14.7

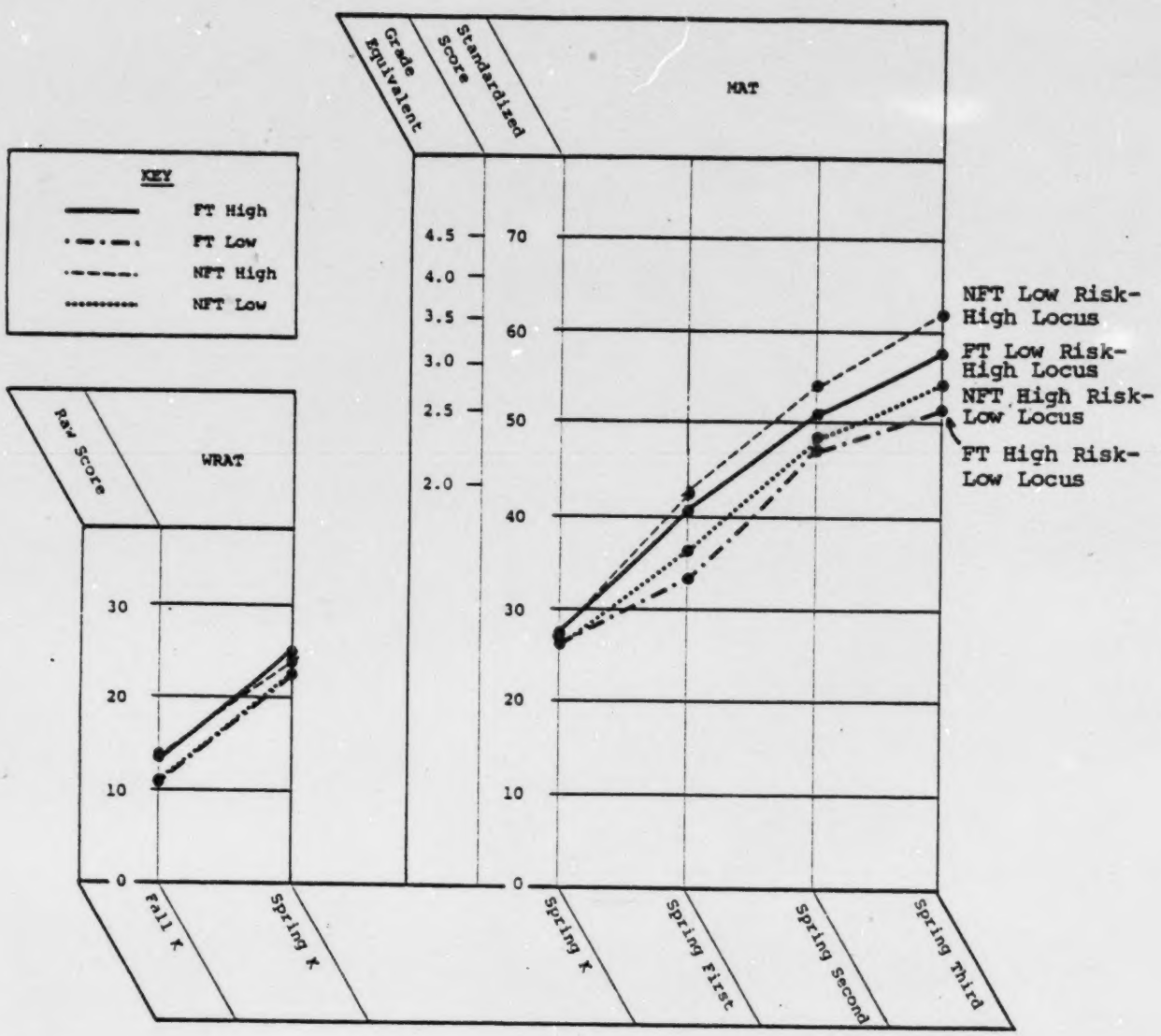
Table II- 27

BACKGROUND CHARACTERISTICS OF CHILDREN IN THE HIGH LOCUS - LOW RISK CATEGORY

HIGH LOCUS	NON-FOLLOW THROUGH	FOLLOW THROUGH	RESPONSIVE EDUCATION	TEEN	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
Number of Children	802	815	73	96	68	59	111	45	82	95	98	48	39
Family Income in Dollars													
Mean	7097.	5613.	4886.	6163.	5991.	4634.	4789.	5342.	5810.	6148.	6691.	5304.	5082.
Standard Deviation	2804.	2816.	2688.	2576.	2842.	2374.	2740.	2872.	2956.	2870.	2786.	2771.	2670.
Median	7936.	5194.	4300.	5714.	5800.	4250.	4200.	4700.	5640.	6175.	6800.	5000.	4950.
Head of Household's Occupation													
Mean	14.42	13.67	13.52	13.47	14.37	13.46	13.11	13.43	13.65	13.83	14.49	13.77	12.82
Standard Deviation	2.49	2.13	2.16	1.94	2.23	1.78	1.98	1.86	2.12	2.08	2.44	2.37	1.45
Median	13.73	13.13	12.82	13.24	13.39	13.07	12.77	13.11	13.02	13.31	13.70	13.20	12.72
Mother's Education													
Mean	5.84	5.71	5.63	5.70	5.71	5.45	5.72	5.65	5.65	5.63	6.06	5.62	5.68
Standard Deviation	1.01	0.94	0.86	0.99	0.93	0.83	0.97	1.01	0.96	0.84	0.70	1.29	1.02
Median	5.87	5.78	5.71	5.80	5.71	5.61	5.63	5.80	5.68	5.69	6.00	5.81	5.88
Sex													
Percent Female	50.0	53.5	54.1	57.3	55.9	49.2	58.6	42.2	57.3	48.4	57.1	43.8	51.3
Children's Ethnicity													
Percent Black	29.7	54.1	45.9	51.0	48.5	72.9	82.9	71.1	40.2	69.5	19.4	14.6	84.6
Percent White	65.7	40.2	50.0	44.8	51.5	27.1	15.3	20.0	53.7	30.5	80.6	39.6	15.4
Percent Spanish Speaking	4.6	5.6	4.1	4.2	0.0	0.0	1.8	8.9	6.1	0.0	0.0	45.8	0.0
First Language													
Percent English	97.3	96.9	98.6	95.8	98.5	100.0	99.1	95.6	97.6	100.0	100.0	81.3	84.6
Percent Spanish	2.6	2.9	1.4	3.1	0.0	0.0	0.9	4.4	2.4	0.0	0.0	18.8	15.4
Preschool Experience													
Percent Head Start	14.1	40.7	48.6	51.0	27.9	42.4	47.7	55.6	31.7	26.3	40.8	45.8	30.8
Percent Some Preschool	31.7	35.6	33.8	21.9	45.6	45.8	26.1	26.7	35.4	56.8	25.5	27.1	61.5
Percent No Preschool	54.2	23.7	17.6	27.1	26.5	11.9	26.1	17.8	32.9	16.8	33.7	27.1	7.7

Table II- 28

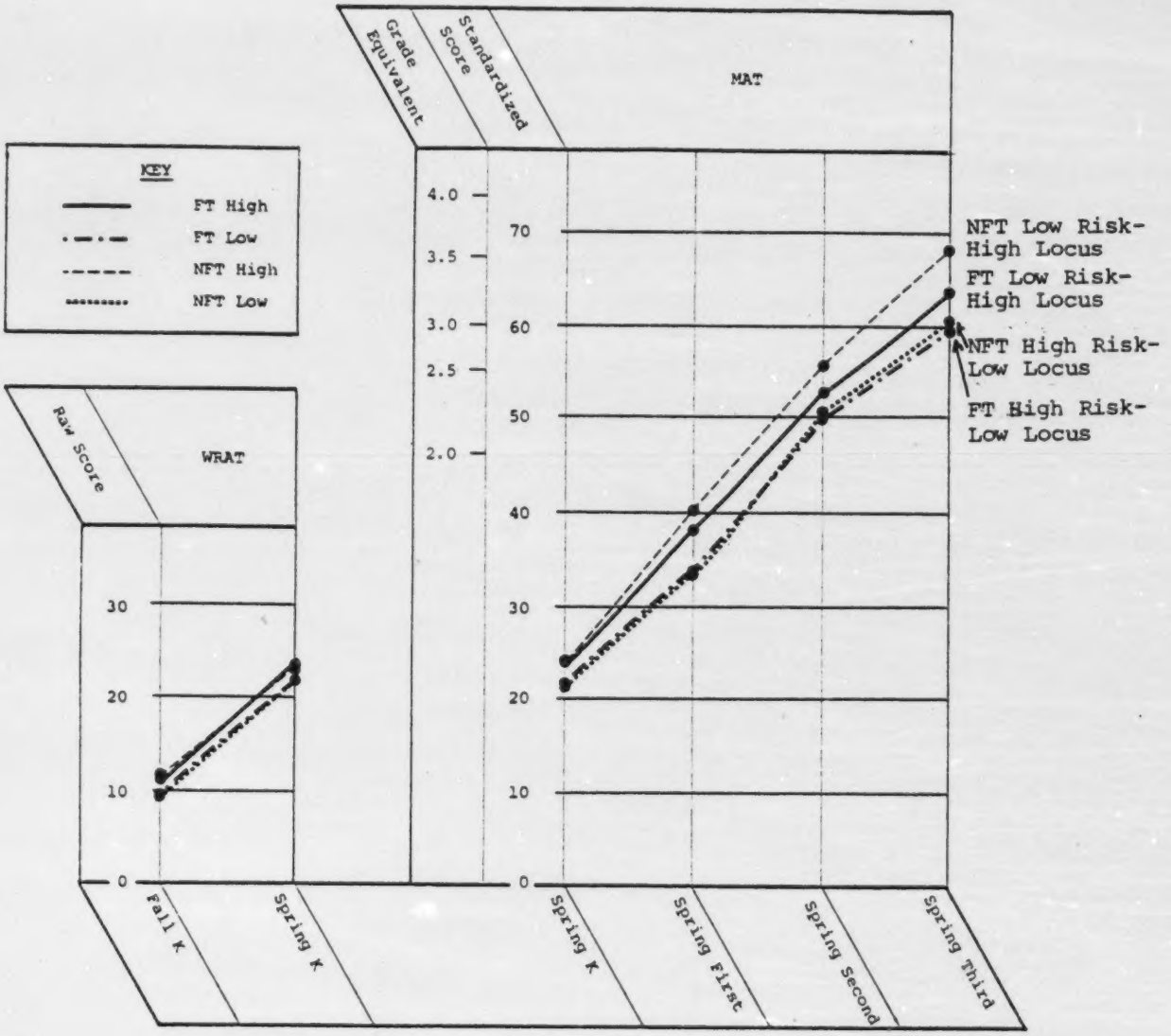
LONGITUDINAL PROFILE OF POOLED SPONSORS' AND POOLED NFT CHILDREN'S READING SCORES FOR THE PARENT LOCUS RISK DIMENSION



	Fall Kindergarten WRAT		Spring Kindergarten WRAT		Spring Kindergarten MAT		Spring First Grade MAT		Spring Second Grade MAT		Spring Third Grade MAT	
	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT
High Locus Median	13.6	13.9	24.7	23.9	27.2	27.1	40.6	42.5	50.9	54.2	57.7	62.0
N	815	802	677	455	669	444	421	369	627	494	815	802
Percent ≥ NFT Median	51		61		48		38		35		31	
Low Locus Median	10.8	10.9	22.7	22.7	26.3	26.2	33.2	36.1	46.9	48.3	51.7	54.4
N	690	642	518	336	508	315	348	280	446	368	690	642
Percent ≥ NFT Median	53		52		48		40		40		40	

Table II-29

LONGITUDINAL PROFILE OF POOLED SPONSORS' AND POOLED NFT CHILDREN'S MATHEMATICS SCORES FOR THE PARENT LOCUS RISK DIMENSION



	Fall Kindergarten WRAT		Spring Kindergarten WRAT		Spring Kindergarten MAT		Spring First Grade MAT		Spring Second Grade MAT		Spring Third Grade MAT	
	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT	FT	NFT
High Locus Median	11.4	11.8	23.4	23.0	24.0	24.1	38.0	40.2	52.8	55.6	63.9	68.1
N	815	802	677	455	665	446	401	342	606	485	815	802
Percent ≥ NFT Median	53		49		46		45		36		35	
Low Locus Median	9.6	9.5	22.1	22.1	21.9	21.7	33.8	33.6	49.7	50.5	59.6	60.5
N	690	642	518	336	507	324	331	263	434	357	690	642
Percent ≥ NFT Median	51		45		54		53		47		48	

Table II-30

LONGITUDINAL PROFILE OF SPONSORS' HIGH RISK-EXTERNAL LOCUS
CHILDREN'S READING SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAI+ PROCESS	
FALL KINDERGARTEN WRAT*														
Median	10.9	10.8	12.2	10.3	13.8	10.4	11.3	9.9	10.6	11.6	11.1	10.0	14.5	
N	642	690	45	54	40	56	115	68	41	59	40	138	34	
Percent ≥ NFT Median	--	53	60	54	68	49	49	44	51	59	58	41	74	
SPRING KINDERGARTEN WRAT														
Median	22.7	22.7	25.1	20.0	24.5	23.1	23.6	20.1	22.2	22.3	23.7	18.4	--	
N	336	518	43	50	38	46	93	64	37	51	39	57	--	
Percent ≥ NFT Median	--	52	72	50	64	54	58	39	49	49	69	35	--	
SPRING KINDERGARTEN MAT*														
Median	26.2	26.3	26.2	25.6	27.0	26.8	27.3	25.9	26.6	26.0	26.8	25.9	--	
N	315	508	43	52	36	46	92	61	33	51	39	55	--	
Percent ≥ NFT Median	--	48	46	31	56	53	60	43	51	46	56	42	--	
SPRING FIRST GRADE MAT														
Median	36.1	33.2	31.2	36.0	37.0	41.5	38.0	27.8	29.3	32.3	34.0	34.8	32.8	
N	280	348	23	21	20	32	59	35	23	27	15	73	20	
Percent ≥ NFT Median	--	40	22	48	55	62	51	11	35	34	47	38	35	
SPRING SECOND GRADE MAT														
Median	48.3	46.9	47.2	45.5	51.5	51.8	47.3	42.5	42.5	47.0	46.9	47.4	--	
N	368	446	36	48	32	45	90	56	28	37	35	39	--	
Percent ≥ NFT Median	--	40	44	37	59	60	40	23	25	35	37	38	--	
SPRING THIRD GRADE MAT														
Median	54.4	51.7	51.9	51.7	55.0	55.5	53.0	47.6	48.4	50.4	54.0	50.5	50.5	
N	642	690	45	54	40	56	115	68	41	59	40	138	34	
Percent ≥ NFT Median	--	40	40	35	53	54	42	26	37	32	48	41	35	

*WRAT scores are raw scores; MAT scores are publisher's standard scores.

Table II-31

LONGITUDINAL PROFILE OF SPONSORS' LOW RISK-INTERNAL LOCUS
CHILDREN'S READING SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
FALL KINDERGARTEN WRAT*													
Median	13.9	13.6	13.3	14.1	15.1	14.0	13.6	14.8	11.8	13.3	15.7	11.2	20.2
N	802	815	74	96	68	59	111	45	82	95	98	48	39
Percent ≥ NFT Median	--	51	49	53	56	51	51	58	39	49	56	31	72
SPRING KINDERGARTEN WRAT													
Median	23.9	24.7	24.7	24.3	24.8	2.75	25.5	24.3	24.0	24.0	25.2	22.0	--
N	455	677	71	92	52	40	95	45	76	77	98	31	--
Percent ≥ NFT Median	--	61	62	55	62	68	71	56	54	57	76	29	--
SPRING KINDERGARTEN MAT*													
Median	27.1	27.2	27.1	27.0	27.0	29.4	28.0	26.4	26.3	26.1	28.4	26.0	--
N	444	669	67	91	52	41	95	42	76	79	97	29	--
Percent ≥ NFT Median	--	48	45	45	45	74	62	39	37	28	65	31	--
SPRING FIRST GRADE MAT													
Median	42.5	40.6	39.5	40.7	38.0	43.2	42.0	28.9	39.8	36.5	47.5	38.0	33.4
N	369	421	36	53	29	32	55	28	48	48	46	31	15
Percent ≥ NFT Median	--	38	33	43	21	59	47	15	35	23	74	23	27
SPRING SECOND GRADE MAT													
Median	54.2	50.9	50.8	49.0	54.5	54.3	51.0	46.0	51.1	46.5	56.0	49.0	--
N	494	627	61	86	48	45	83	41	66	80	95	22	--
Percent ≥ NFT Median	--	35	31	31	50	49	30	22	30	20	54	18	--
SPRING THIRD GRADE MAT													
Median	62.0	57.7	57.2	56.2	60.5	59.7	58.8	52.2	57.8	52.6	63.5	53.5	50.2
N	802	815	74	96	68	59	111	45	82	95	98	48	39
Percent ≥ NFT Median	--	31	38	33	44	34	30	18	34	22	58	15	3

*WRAT scores are raw scores; MAT scores are publisher's standard scores.

Table II-32

LONGITUDINAL PROFILE OF SPONSORS' HIGH RISK-EXTERNAL LOCUS
CHILDREN'S MATHEMATICS SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
FALL KINDERGARTEN WRAT*													
Median	9.5	9.6	9.8	8.5	10.5	9.9	10.3	9.3	10.6	9.0	10.7	8.8	11.8
N	642	690	45	54	40	56	115	68	41	59	40	138	34
Percent ≥ NFT Median	--	51	53	44	53	54	57	49	54	46	55	45	65
SPRING KINDERGARTEN WRAT													
Median	22.1	22.1	22.1	21.2	22.0	23.9	23.1	21.6	22.0	22.0	23.0	20.4	--
N	336	518	43	50	38	46	93	64	37	51	39	57	--
Percent ≥ NFT Median	--	45	44	30	43	68	59	52	40	45	56	21	--
SPRING KINDERGARTEN MAT*													
Median	21.7	21.9	22.1	20.3	20.9	22.8	27.7	20.9	22.6	20.3	22.0	20.7	--
N	324	507	41	53	36	47	93	59	35	48	39	56	--
Percent ≥ NFT Median	--	54	58	40	42	62	77	43	71	38	56	38	--
SPRING FIRST GRADE MAT													
Median	33.6	33.8	34.2	33.5	35.5	32.8	36.0	24.5	34.1	35.7	37.0	33.6	33.5
N	263	331	21	18	16	30	56	34	23	27	13	73	20
Percent ≥ NFT Median	--	53	57	50	57	44	64	18	61	67	69	51	50
SPRING SECOND GRADE MAT													
Median	50.5	49.7	50.5	49.6	49.2	52.6	51.8	39.8	48.5	51.7	49.2	51.0	--
N	357	434	36	47	31	44	79	55	30	37	38	37	--
Percent ≥ NFT Median	--	47	50	40	42	64	57	20	47	51	47	49	--
SPRING THIRD GRADE MAT													
Median	60.5	59.6	58.2	61.8	56.5	63.1	61.8	52.8	58.0	58.3	58.5	60.8	57.5
N	642	690	45	54	40	56	115	68	41	59	40	138	34
Percent ≥ NFT Median	--	48	42	56	40	66	55	29	51	42	48	51	38

*WRAT scores are raw scores; MAT scores are publisher's standard scores.

Table II-33

LONGITUDINAL PROFILE OF SPONSORS' LOW RISK-INTERNAL LOCUS
CHILDREN'S MATHEMATICS SCORES

	OVERALL NFT	OVERALL FT	RESPONSIVE EDUCATION	TEEM	BANK STREET	DIRECT INSTRUCTION	BEHAVIOR ANALYSIS	COGNITIVE CURRICULUM	PARENT EDUCATION	EDC	IELP	SEDL	CAL PROCESS
FALL KINDERGARTEN WRAT*													
Median	11.8	11.4	11.4	11.9	10.3	12.6	11.7	12.5	11.3	11.2	13.2	10.7	12.9
N	802	815	74	96	68	59	111	45	82	95	98	48	39
Percent ≥ NFT Median	--	53	49	53	42	63	53	58	49	48	65	40	64
SPRING KINDERGARTEN WRAT													
Median	23.0	23.4	23.3	22.8	22.5	25.2	25.4	22.8	22.9	22.2	25.7	21.0	--
N	455	677	71	92	52	40	95	45	76	77	98	31	--
Percent ≥ NFT Median	--	49	49	57	33	78	66	40	57	34	85	36	--
SPRING KINDERGARTEN MAT*													
Median	24.1	24.0	22.7	22.1	22.0	26.4	29.6	22.5	24.0	23.0	29.6	21.4	--
N	446	665	65	91	49	41	94	44	76	77	97	31	--
Percent ≥ NFT Median	--	46	31	33	29	71	73	35	45	32	68	23	--
SPRING FIRST GRADE MAT													
Median	40.2	38.0	37.0	35.2	33.3	40.0	47.1	29.2	41.5	39.7	52.7	37.0	33.3
N	342	401	35	51	27	29	52	28	44	47	45	29	14
Percent ≥ NFT Median	--	45	40	27	26	48	69	11	55	47	71	38	21
SPRING SECOND GRADE MAT													
Median	55.6	52.8	52.8	52.2	52.3	53.6	53.8	50.0	52.7	50.1	56.5	51.3	--
N	485	606	64	85	37	41	78	40	67	75	95	23	--
Percent ≥ NFT Median	--	36	37	28	38	32	44	12	30	36	54	26	--
SPRING THIRD GRADE MAT													
Median	68.1	63.9	64.2	63.9	63.9	71.3	66.6	59.7	61.5	60.6	68.0	61.5	59.2
N	802	815	74	96	68	59	111	45	82	95	98	48	39
Percent ≥ NFT Median	--	35	34	39	29	71	41	18	23	23	49	27	23

*WRAT scores are raw scores; MAT scores are publisher's standard scores.

Follow Through and non-Follow Through groups. The weak relationship between parents' locus of control and the children's academic achievement in this study is not surprising considering the very general nature of the items in the locus scale. Perhaps a locus scale that was more specific and relevant to parents' feelings about their control over the educational system and their abilities to help their children would have been a more powerful indicator.

SUMMARY AND CONCLUSIONS

The primary motivation for this exploratory and descriptive study was to ascertain whether Follow Through and individual Follow Through sponsors diminish the size of the traditional relationship between disadvantaged status and poor school achievement. To this end, we examined patterns of academic achievement over four years for Follow Through and non-Follow Through children who at the beginning of kindergarten were at the top and bottom of the distributions of four variables which are correlated with academic achievement: family income, educational level attained by the head of the household, the Peabody Picture Vocabulary Test scores at the beginning of kindergarten, and parents' scores on a locus of control scale.

The performance of the NFT children was utilized as the standard against which to judge the performance of the Follow Through children. The criteria for inclusion in a given category were applied uniformly to both FT and NFT children. The Low Risk children in the high income category were by definition less disadvantaged than the low income children in the High Risk category. Although the criteria for inclusion in a given category were applied uniformly to both FT and NFT children within each risk category, examination of background statistics such as mother's education, family income, and occupational status of the head of the household revealed that all of the Low Risk groups were considerably less disadvantaged than the High Risk groups. Furthermore, the Low Risk NFT children in each of the four risk categories were less disadvantaged than the Low Risk FT children. The High Risk FT and NFT groups were generally similar in terms of background variables such as family income and mother's education.

Our attempt to discover whether Follow Through or any of the individual sponsors had altered the traditional relationship between degree of socioeconomic disadvantage and school achievement was organized around three

questions, and the main outcomes of the study will be summarized in response to those questions.

- Are the patterns of achievement across grades different for Follow Through versus non-Follow Through children at high and low academic risk?

In general, the results of this exploratory study indicate that the more advantaged Low Risk Follow Through children had substantially better reading and mathematics test scores than the more disadvantaged Low Risk children at each grade level. As the children progressed from kindergarten to the third grade, the performance gap between the High and Low Risk children widened and the results conformed to a pattern of fan spread as described by Campbell and Boruch (1975).

The overall level of performance of the Low Risk Follow Through children was consistently below that of the Low Risk NFT children. On the average the pooled group of Low Risk FT children performed at a grade level which was approximately six months behind the Low Risk NFT children whose performance was typical of children at the end of the third grade according to the publisher's grade equivalent scores.

The median MAT reading and mathematics scores for the pooled FT High Risk children were generally similar across all four grades (e.g., spring kindergarten through spring of the third grade). In general, after kindergarten, both FT and NFT High Risk children scored at a level which was about one year or more behind the level typical of children at the end of the third grade. This pattern of results was consistent across risk indicators. Typically, the median test scores of both FT and NFT High Risk children were similar across time; however, in several cases the proportions of FT children with reading or mathematics scores equal to or greater than the NFT children's scores declined during the period between the end of kindergarten and the end of the third grade.

The results of this study suggest that for the majority of the children enrolled, Follow Through has not diminished the relationship between relative degree of socioeconomic, experiential, or home environmental disadvantage and school performance.

- Are there differences in individual sponsors' patterns of outcomes for children at high versus low risk?

In general, the patterns of results for individual sponsors are quite similar to those for the pooled FT groups. That is, most sponsors' Low Risk children score at a higher level than the High Risk groups in kindergarten, and this relative position is maintained over the subsequent three grades. Most sponsors' High Risk children score at about the same level or below the level of the NFT children at the beginning of kindergarten, and these relative positions are maintained across the subsequent years' testing. Most sponsors' Low Risk children score at or above the NFT level at the beginning of kindergarten but score below the NFT level at subsequent time points. There are exceptions, however, and some sponsors show losses over time relative to the NFT group, and a few sponsors show a few small gains on reading or mathematics depending upon which risk indicator is used.

For example, the results for the High Risk income groups show that for most of the eleven sponsors there is no change in the outcomes of the FT group, relative to the NFT group across the four years. However, there are some exceptions; the Direct Instruction sponsor shows small gains in reading, and the SEDL sponsor shows rather dramatic gains in mathematics. In both of these sponsors' groups, the children score at a level below their appropriate grade level. Children in the Cognitive Curriculum group show losses in mathematics relative to the NFT group over four years, and the children in the EDC High Risk group show a loss in reading relative to the NFT group over four years. Children in the California Process model show losses in both reading and mathematics relative to the NFT group over the four years of the study.

When education is used as the risk indicator most sponsors' High Risk groups show no change over the four years in the children's performance relative to that of the NFT children. Several sponsors, however, show losses in reading relative to the NFT group over the four year period. These were Responsive Education, Direct Instruction, TEEM, EDC, and California Process sponsors. Several sponsors also showed losses in mathematics relative to the NFT group over the four years. These sponsors were the Responsive Education, Cognitive Curriculum, and California Process sponsors. The Behavior Analysis sponsor showed a slight gain in mathematics scores relative to the NFT group.

Six of the eleven sponsors show no change in the relative rankings of FT and NFT children over the four year period when the PPVT is used as the risk indicator. However, TEEM, EDC, Cognitive Curriculum, Parent Education, and California Process sponsors' High Risk groups show losses in reading relative to the NFT comparison group; and two sponsors' High Risk groups (Cognitive Curriculum and EDC) show losses in mathematics relative to the NFT group. Although all sponsors' Low Risk groups perform at a higher level on reading and mathematics tests than the High Risk groups, their patterns of results over the four years are similar to those seen for the High Risk groups. That is, most of the Low Risk FT groups start out in kindergarten at a level which is equal to or above that of the NFT group and maintain this relative position across the four years of the study. However, several sponsors show dramatic losses relative to the NFT group. In reading, the EDC, Behavior Analysis, and California Process sponsors show dramatic drops in performance levels relative to the NFT comparison group; and in mathematics, the Bank Street, Cognitive Curriculum, California Process, and Parent Education sponsors show dramatic drops relative to the NFT comparison group.

The Parent Locus indicator showed little differentiation among the various FT and NFT and High and Low Risk groups. However, when outcomes for various sponsors' groups for this indicator are examined, we find the same general patterns of relationships. Eight out of the eleven sponsors' High Risk groups were less well off relative to the NFT group at the end of the third grade than in kindergarten. This pattern held for both reading and mathematics test scores. This pattern of results was also typical of the sponsors' Low Risk groups in reading (e.g., declining scores vis a vis the NFT group), but in mathematics the relative positions of the FT groups and the NFT group remained fairly stable.

This rather complicated pattern of results for sponsors indicates that none of the individual sponsors materially diminished the relationship between disadvantaged status and poor academic test performance. In fact, the results indicate that regardless of sponsor, this relationship may become stronger over time. The children who are most disadvantaged appear to benefit less from Follow Through than their relatively more advantaged peers in the Low Risk groups, who seem in turn to benefit less from public schooling than their relatively less disadvantaged peers in the NFT group.

- Are achievement outcomes different for the four risk indicators?

With some minor variations, patterns of achievement outcomes are quite similar for the four risk indicators. The exception is the Parent Locus indicator which provided less differentiation among the risk groups. However, even for this indicator, the patterns of results were similar to those found with the other indicators. Regardless of which indicator was used, the High Risk groups performed at a lower level than the Low Risk groups, and Low Risk NFT groups generally performed better than Low Risk FT groups. The patterns of performance of FT and NFT High Risk groups were generally quite similar for each of the four indicators; and children classified as High Risk on each of the four indicators generally scored at a level which was a year or more behind grade level in reading and mathematics.

PART II
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